More developments using

B. F. Goodrich Chemical *raw materials*

B. F. Goodrich Chemical Company does not make these products. We supply the Hycar rubber only.

On Aircraft, Oil Well and Electrical Jobs

. . . versatile Hycar scores high!

LOOK at the three typical uses of Hycar pictured. They show the wide range of applications for this versatile American rubber. And they also show how Hycar helps improve products and operations—save money.

The carburetor gasket is used on a Navy helicopter. Hycar bonds the asbestos fibers of the gasket, helps seal power *in*—keep trouble *out*. Hycar resists heat, oil, solvents and retains its high tensile strength. It helps make the gasket non-absorbing, non-swelling and non-cracking.

The Hycar rubber "O" ring seal is one of many uses for Hycar in the petroleum industry. It's used on a powerful pump designed for jet bit, big hole and deep drilling. The Hycar "O" ring seals tightly, resists abrasion and the hydrocarbons entrained in the drilling fluid.

On the volt-ammeter, the trigger is made with a Hycar rubber-phenolic compound. Breakage under sudden pressure which used to plague rag-filled phenolic triggers has been reduced almost to zero.

Hycar's many advantages may be the perfect answer to your product improvement or development problems—and your sales plans. We'll help you select a Hycar rubber compound exactly suited to your needs. For technical information, please write Dept. HB-7, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON colors

For rubber products that are better
Choose the proper **Philblack*** *letter!*

EASY For easy mixing, fast processing, use Philblack A. Smooth tubing—accurate molding—brilliant finish, too.

TOUGH For a rubber that's *tough*, use Philblack O, the HAF black with a record for long, durable life plus good electrical conductivity.

RIGHT For high abrasion applications at moderate cost, use Philblack I—our new ISAF (Intermediate Super Abrasion Furnace) black.

SUPER There's nothing like Philblack E for super strength, super wearing ability! That's how Philblack E won its title . . . SAF!

The Philblacks are famous for supplying qualities you need in *your* rubber products. Consult our technical sales representative, or write our nearest office.

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PHILBLACK SALES DIVISION

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The Philblacks are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago, and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

Cut your scrap loss with Pliovic

Re-runs of trim like this are easy with PLIOVIC G90V

You will find—as many vinyl processors have already discovered—that you get less scrap, more re-usable trim, tailings and ends when you turn to PLIOVIC G90V—Goodyear's new polyvinyl chloride resin.

That's because PLIOVIC G90V has outstanding heat stability—giving less degradation and loss of physical properties when reworked. It also permits high calender speeds and fast extrusions that mean more production.

PLIOVIC G90V has a high uniform bulk density for ease in handling—good color for use in clear or pigmented compounds—and can easily be compounded for use in a wide range of products.

First in a series of polyvinyl chloride resins, PLIOVIC G90V is another use-proved product by Goodyear. Write for full details today to:

Goodyear, Chemical Division, Akron 16, Ohio

Pliolite, Chemigum, Pliobond, Pliovic—T.M.'s
The Goodyear Tire & Rubber Company, Akron, Ohio

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LINERETTE

for faster Separation on Making Lines

Separation of stock and Linerette paper on the making lines is an easy, efficient operation. Linerette, a specially processed separating paper, prevents adhesion, insures faster operation on the making lines.

And Linerette features are important in other phases of processing, too. Frictioned stocks may be fed from the calender right into Linerette. It leaves no objectionable cloth marks and contains no oil or wax. When used in die-cutting operations, clippings may be worked away with regular scrap.

Linerette supplies additional savings when used in shipping lightweight stocks—there is no need to return a fabric liner. Where cleanliness is a vital factor, Linerette serves as a low cost lining for trays and containers.

GET THE FULL STORY ON CLIMCO PROCESSING

Illustrated booklet tells about Climco Liners and Linerette separating paper. Tells how to get better service from liners. Write for your copy now.

Linerette is supplied in any width up to and including 54″, in rolls of 9″, 11½″, 13″, and 15″ diameters; put up on 3″ i.d. cores. The yield is approximately six square yards to the pound. A 9″ roll contains 375 linear yards and a 15″ diameter about 1150 linear yards.

SAMPLES SENT ON REQUEST—*simply specify width desired.*

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CLIMCO

LINERETTE

INTERLEAVING PAPER

MADE BY THE MANUFACTURERS OF CLIMCO PROCESSED LINERS

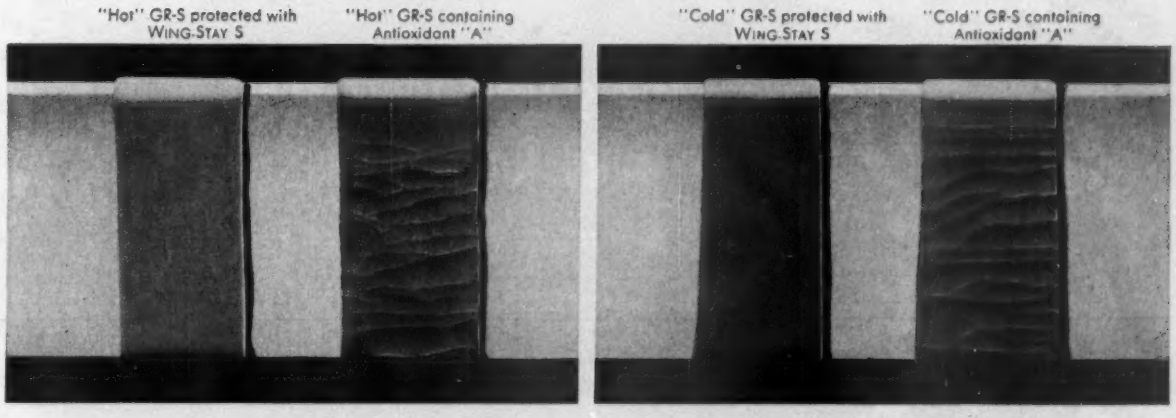
STOP THE SUN

with

Wing-Stay S

BAKED BY THE SUN—*this hardened chunk of raw GR-S was "protected" by a non-staining antioxidant other than* WING-STAY S

SIDE BY SIDE TESTS — provide ample proof of added protection of WING-STAY S as compared to a phosphite ester type, non-staining antioxidant. These cured samples were exposed to sunlight for three weeks.


"Hot" GR-S protected with WING-STAY S
"Hot" GR-S containing Antioxidant "A"
"Cold" GR-S protected with WING-STAY S
"Cold" GR-S containing Antioxidant "A"

YOU can stop the sun in its attack on light-colored rubber with WING-STAY S—Goodyear's outstanding, non-staining, non-discoloring antioxidant.

WING-STAY S is a liquid, phenolic type compound. It is easily incorporated in dry rubber or latices. It is extremely resistant to heat, sunlight and extraction by water. It is widely used to maintain the properties of both natural and synthetic rubber products with a minimum of discoloration, odor or migration.

One look at the samples shown here tells you how much more protection WING-STAY S gives GR-S against direct sunlight than another widely used non-staining antioxidant. Your own tests will give you further proof.

Try adding WING-STAY S to any non-staining GR-S. Then, subject the rubber to heat aging at 212°F or exposure to sunlight. You will soon see how WING-STAY S provides the best balance between preservative and non-staining properties and low cost.

For further details and samples, write to: Goodyear, Chemical Division, Akron 16, Ohio

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INDOPOL	H-100	H-300
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Vis. SSU @ 210° F.	1000	3000

Send for samples

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RUBBER FABRICATORS NEED ACCURATE CUTTING DIES

For Cutting

Rubber, Neoprene, Plastics, etc.
Sheeting, Foam, Sponge, Cellular,
Cured & Uncured

Gang Dies Our Specialty

- Accuracy to close Tolerances
- Durability
- Genuine Understanding of the problems of rubber goods manufacturers

MALLET HANDLE DIES

PURPOSE — For those who have no machinery and do not wish to purchase any. For Cutting — Rubber, Neoprene, Plastics, etc.

ADVANTAGE — Cut direct from bolts or not.

SERVICE—One to three days.

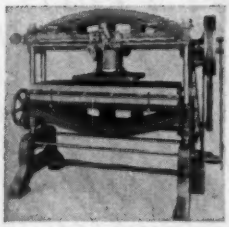
STEEL RULE CUTTING DIES

Used on Die Cutting Press, Printing Press or Power Press

PURPOSE — Especially suited for cutting — Rubber, Neoprene, Plastics, etc.

ADVANTAGE—Low in cost. Suitable for long production runs. It is necessary to cut from rectangular sheets which are fed into the press.

SERVICE—One day service.



STEEL RULE CLICKER DIES

Use On Clicker Machine or Dinker Press

PURPOSE—For Cutting Rubber, Neoprene, Plastics, etc.

ADVANTAGE — More reasonably priced than the all steel dies. Recommended for small and medium quantities where cost of an all steel die is not warranted.

SERVICE—One day service.

ALL STEEL DIES

Use On Clicker Machine or Beam Press or Power Press

PURPOSE—For Cutting— Rubber, Neoprene, Plastics, etc.

ADVANTAGE — Cut direct from rolls without first cutting into sheets.

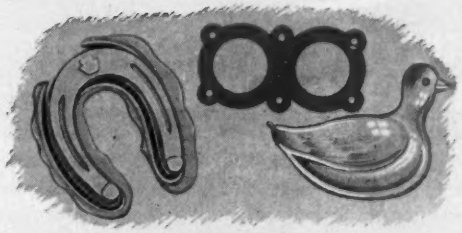
SERVICE—One to three day service on dies.

DIE CUTTING SERVICE

PURPOSE—For those who prefer to have their cutting done by others.

ADVANTAGE—We can die cut your product for you on our own presses rapidly and economically at a low "per thousand" cost.

SERVICE—One to three days.



Dies for cutting
Gaskets, flashing from molded parts, rubber soles, foam and sponge for furniture padding, inflated toys, clothing and footwear, etc.

SAME DAY SERVICE

ACCURATE

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MARBON ADDS MODERN PACKAGING TO A MODERN PRODUCT FOR SAFER, FASTER, EASIER HANDLING!

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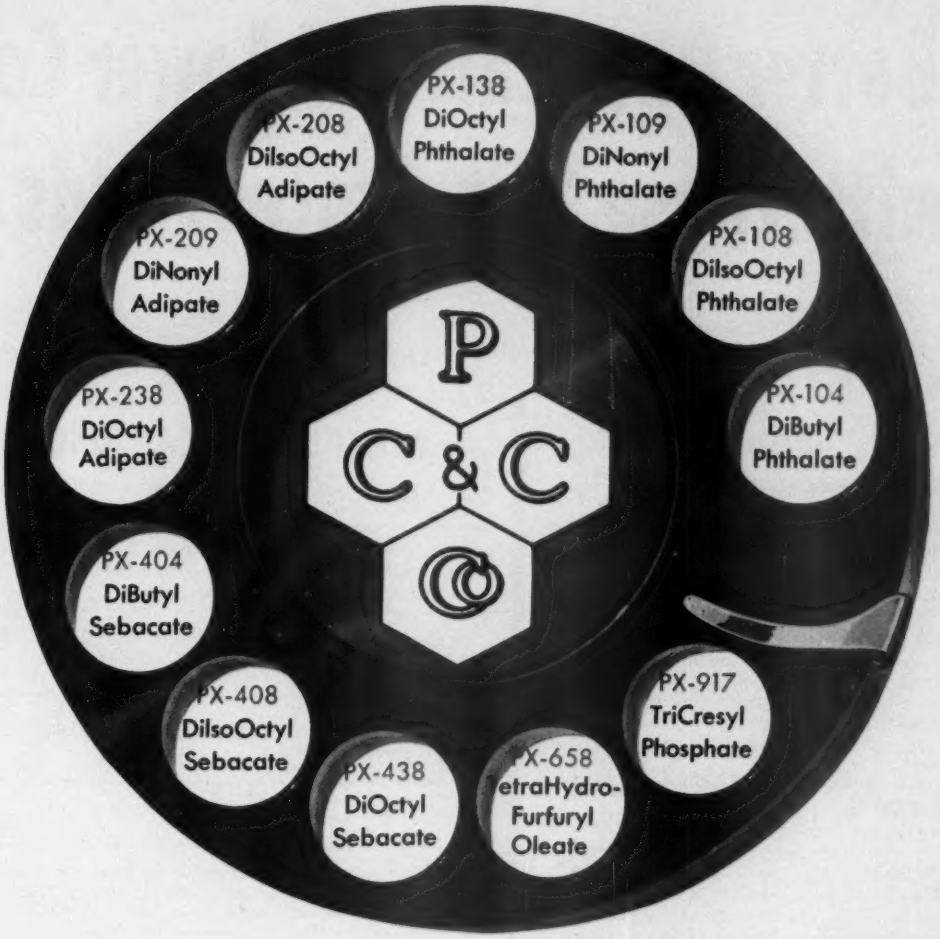

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If you're going to capture and hold your share of today's highly competitive plastics market, you've got to be sure of one thing: unvarying quality in your product and in the *plasticizer* you use. And that's why it pays to buy Pittsburgh PX Plasticizers.

Because we're *basic,* we quality-control every step of our integrated production—from coal to finished plasticizer. So you can be sure of peak plasticizer performance every time—regardless of the size of your order. ● *What's your plasticizer problem?* Heat resistance? Stability? Low temperature flexibility? Drop us a line and we'll help you select the *right* Pittsburgh PX Plasticizers from our broad plasticizer family. *Write today!*

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Get Better Physicals and Lower Costs with These Sun Process Aids

In compounding and processing natural and synthetic rubbers, you can depend on the quality of these Sun "Job Proved" Products. And there's a Sun Rubber Process Aid to satisfy your every requirement.

PRODUCT	WHERE YOU CAN USE IT
CIRCO LIGHT PROCESS AID A general-purpose naphthenic type softener.	In the manufacture of nonstaining reclaims and butyl inner tubes. For Neoprene and natural rubber.
CIRCOSOL-2XH An elasticator composed of special hydrocarbon structures derived from petroleum.	In the manufacture of oil-extended polymers. As a plasticizer and softener for compounding GR-S polymers, natural rubber and combinations of the two.
CIRCOMAR-5AA A free-flowing, dark liquid softener of the asphalt-flux type.	In the manufacture of tires of natural rubber, GR-S polymers, or blends of these two.
CIRCOMAR-25 A heavy, viscous, dark liquid softener of the asphalt-flux type.	In the manufacture of tires of natural rubber, GR-S polymers, or blends of these two.
CIRCOMAR-110 A very low-cost soft asphaltum.	In the manufacture of tires.
SUNDEX-53 A low-cost, relatively aromatic product highly compatible with natural rubber and GR-S polymers.	In the manufacture of oil-extended polymers. In the processing of tires, rubber footwear, matting, toys, semihard rubbers, etc. In extending high Mooney viscosity Neoprene WHV.
SUNDEX-41 A complex dark-colored blend of high mol. wt. petroleum fractions and a specially prepared asphaltum, all derived from selected sources.	For processing "cold rubber."
516 RUBBER PROCESS AID A highly paraffinic type product.	In the manufacture of butyl inner tubes.
PDO 40 RECLAIMING AID A dark-colored product composed of polymerized olefinic hydrocarbons generally cyclic in character.	As a reclaiming agent.
SUNAPTIC ACID A saturated high mol. wt. type naphthenic acid.	In Neoprene latex compounds to eliminate irregularities in the surface of coagulated dip films. As an activating agent in the curing of rubber. May be used as a direct replacement for stearic acid.
SUNOCO ANTI-CHEK A tailor-made petroleum wax.	For protecting rubber from surface cracking caused by sunlight, ultraviolet light, ozone.
SUNOCO WAXES 1290 Yellow 1290 Brown Carefully refined microcrystalline waxes having a melting point of about 180 F.	As mold releasing agents.

For information on these process aids or Sun's "Job Proved" lubricants for rubber-process machinery call your nearest Sun Office or write SUN OIL COMPANY, Phila. 3, Pa., Dept. RA-7

INDUSTRIAL PRODUCTS DEPARTMENT

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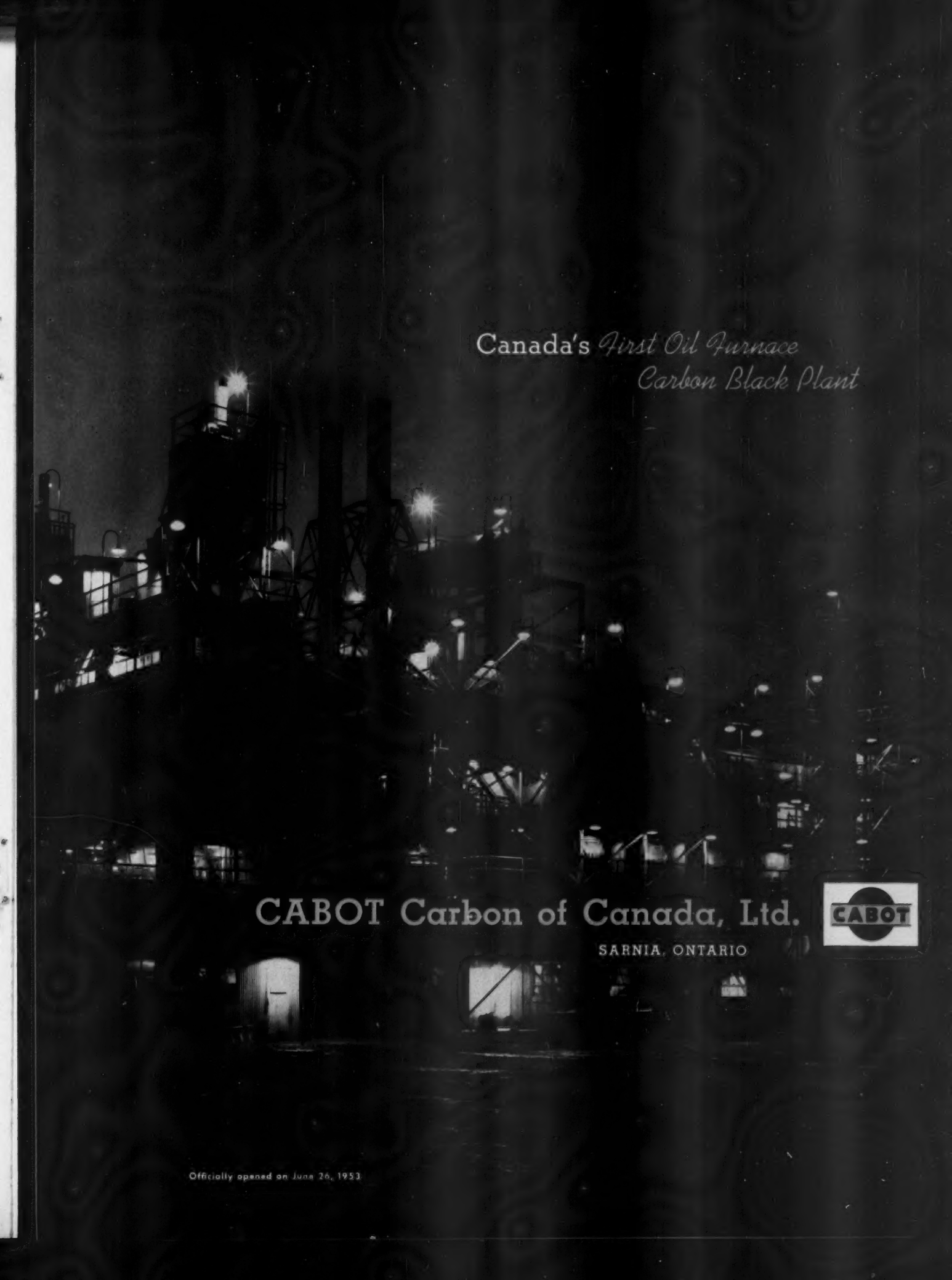
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PLASTICIZER TP-90-B

for maximum LOW TEMPERATURE flexibility

"Thiokol" Plasticizer TP-90-B imparts maximum low temperature flexibility to natural rubber, Neoprene, nitrile-type rubbers, and GR-S. It is highly compatible with these elastomers and does not appreciably impair their physical properties, even at high concentrations. "Thiokol" TP- 90-B is an *efficient* plasticizer.

Many compounders are already aware of the advantages of using "Thiokol" TP-90-B in many critical applications. They specify this high-quality plasticizer for low temperature fuel hose, cellular rubber products and a variety of extruded and molded goods. Actual service performance proves that "Thiokol" TP-90-B will meet their most rigorous low temperature requirements.

Make it a point to try it too! Write today for technical information and samples.

Thiokol CHEMICAL CORPORATION • 784 North Clinton Avenue, Trenton, New Jersey

AIRKEM SPECIFICATIONS

#115 (oil base) for Sponge

#150 for Sponge where "Unicel" ND is blowing agent

#122 (water base) for Foam

#186 for Vinyl Film where d.o.p. is plasticiser

to reduce undesirable odors in GR-S products

Application Information

COMPATIBILITY: Will combine readily with raw mixes.

AGING: Airkem Specifications have no deleterious effect on aging properties.

TENSILE STRENGTH and RESILIENCY: Product shelf checks of more than a year's duration show that Airkem specifications in no way affect tensile strength and resiliency.

PHYSICAL PROPERTIES: Rubber products treated with Airkem Specifications are unaffected in color, foaming, setting time and density.

ODOR COUNTERACTANTS FOR THE RUBBER FIELD

Case History #12

PROBLEM: A leading producer of foam rubber mattresses and pillows was receiving complaints from dealers and consumers about offensive odors emanating from his products. Some of these odors were of low key types hardly discernible except when the user retired. Then, in direct contact, the odors became offensive.

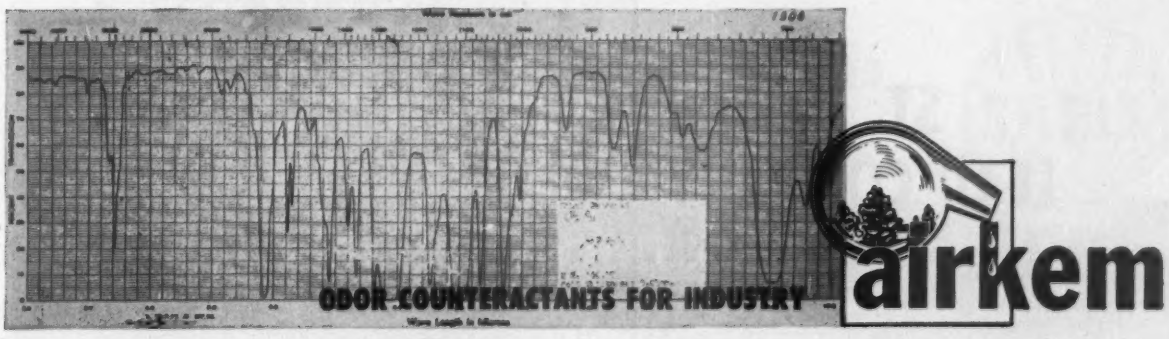
SOLUTION: Airkem engineers discovered that the odor problem was caused by a combination of contributing factors, including the GR-S latex as well as certain polysulphide accelerators. Airkem Specification 115 was added to the raw mix to the amount of ½ of 1% of the dry latex solids.

RESULT: A marked reduction in odor problems and the elimination of this source of consumer complaint. The manufacturer was able to continue with the use of GR-S Latex and other materials which contributed to high manufacturing efficiency and economy. The cost of the Airkem application is measured in pennies per mattress.

These formulations have obtained excellent results in freeing products of odor problems created by decomposed protein in slab or latex, chemical nitrogenous blowing agents, plasticisers, accelerators and stabilizers.

Do you have a problem of this nature? Airkem may be able to provide a practical, low-cost solution.

For information, please write to: **Industrial Applications Dept., Airkem, Inc., 241 E. 44th St., New York 17, N. Y.**



Rubber latex fresh from the tree is poured through strainer into large tank where acid will be added to coagulate it to solid rubber on Malayan plantation.

Loading ore cars in one of the St. Joseph Lead Company's zinc mines in upper New York State.

The beginning of

the END-PRODUCT

One of the many marvels of chemical engineering is graphically exemplified in these photos. The product of a tree in far off Malaya and that of a zinc mine in New York State, namely rubber latex and zinc oxide—together with several other ingredients—will eventually be united in multiple marriage. The resulting "issue" are the countless rubber products essential to the nation's economy.

Zinc Oxide is a basic ingredient in nearly all products made from either natural or synthetic rubber compounds. **ST. JOE lead-free ZINC OXIDES** are produced by a unique electrothermic method—a modification of the direct-from-ore, or American Process. Zinc Oxides thus produced combine most of the desirable properties of the American and French Process types.

ST. JOE ZINC OXIDES are available in grades to fit most any need, and their uniform high quality accounts for their wide use by the country's leading producers of rubber products.

ST. JOSEPH LEAD COMPANY

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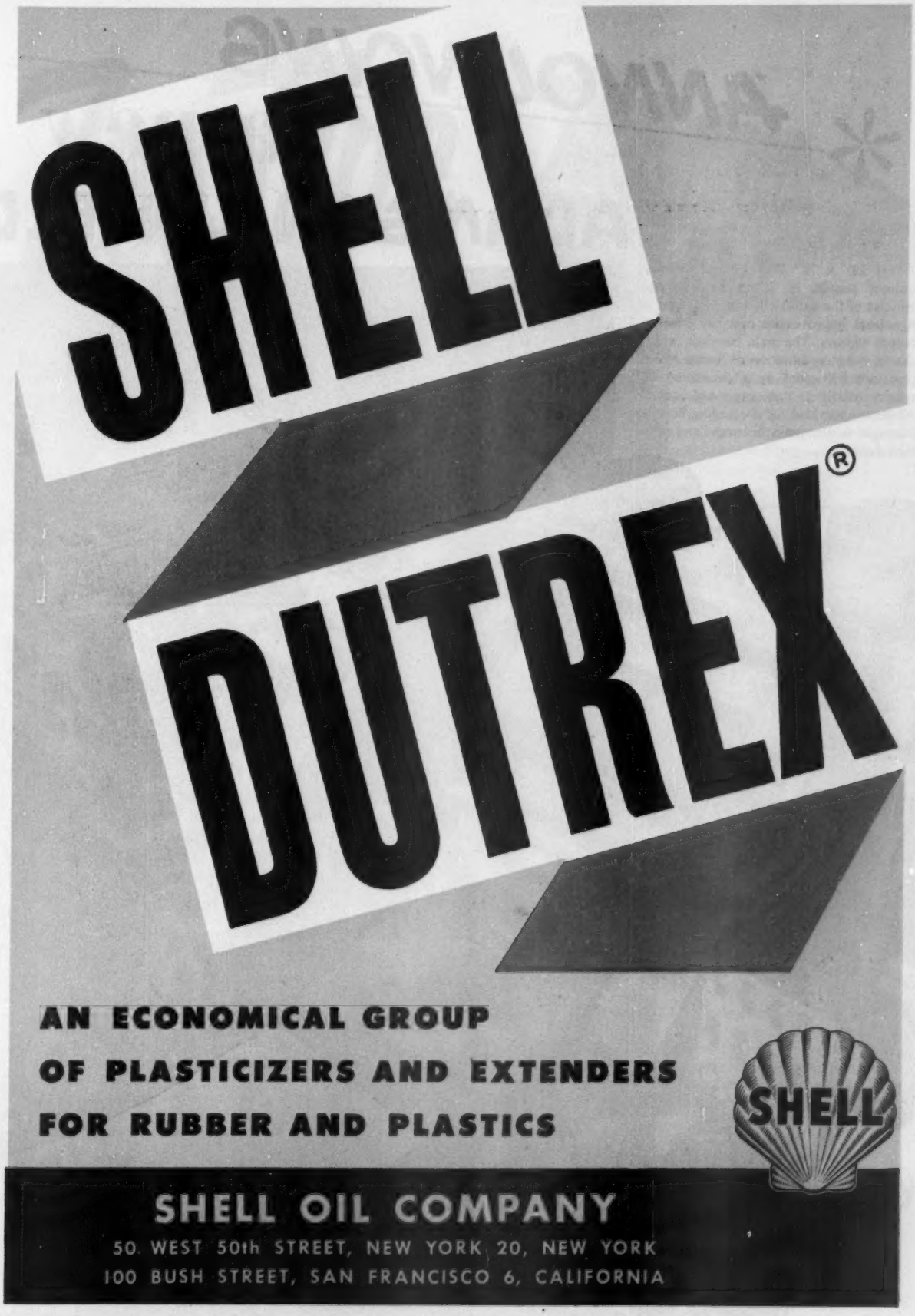
NEW YORK CITY 17

Plant & Laboratory: Monaca (Josephtown) Pa.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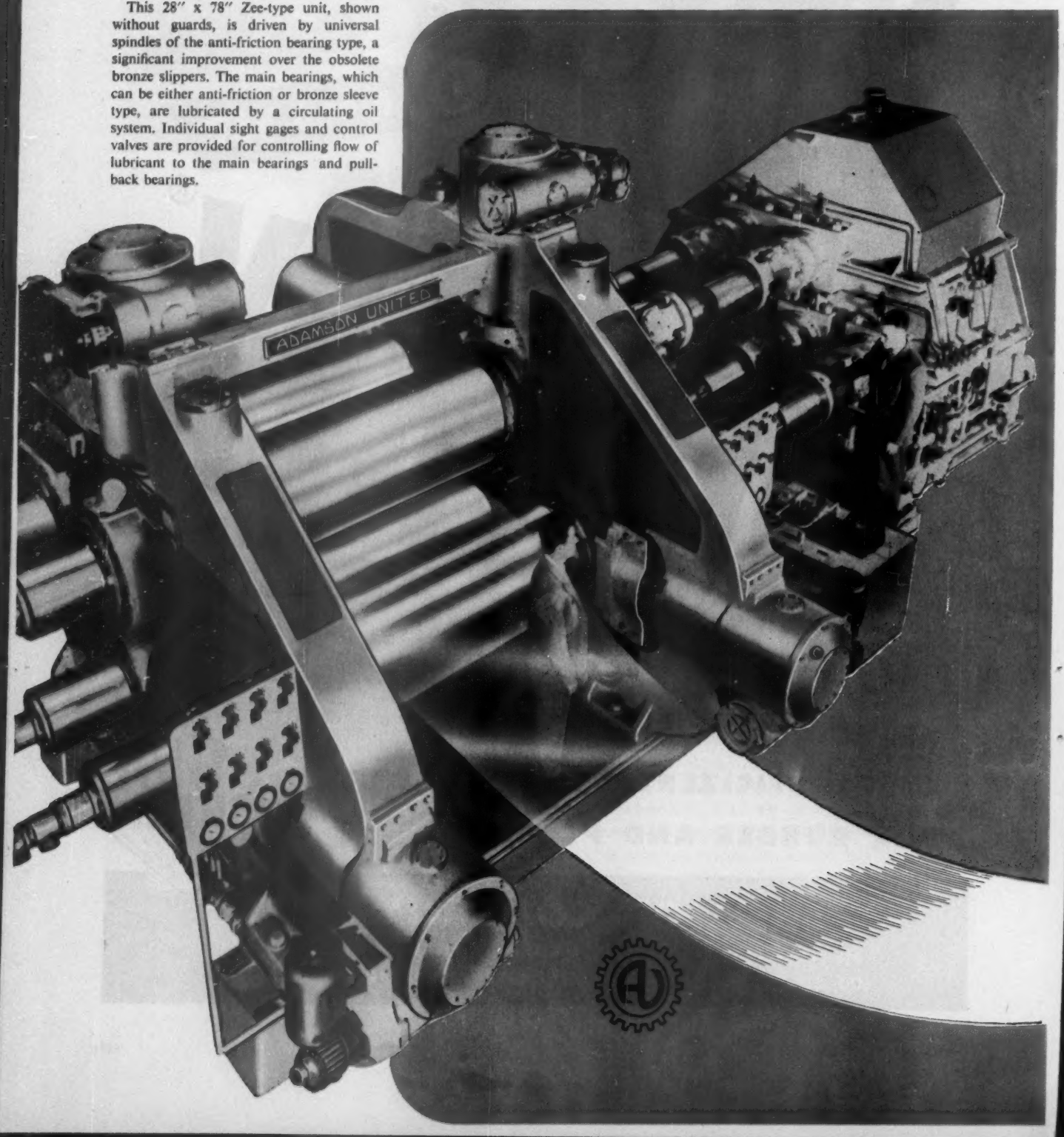
ANNOUNCING a new ADAMSON UNITED.

This 28″ x 78″ Zee-type unit, shown without guards, is driven by universal spindles of the anti-friction bearing type, a significant improvement over the obsolete bronze slippers. The main bearings, which can be either anti-friction or bronze sleeve type, are lubricated by a circulating oil system. Individual sight gages and control valves are provided for controlling flow of lubricant to the main bearings and pull-back bearings.



...Zee-Type

PRECISION

CALENDER

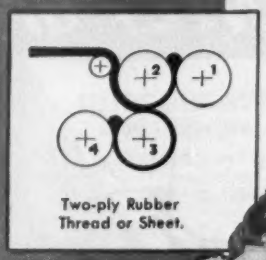
The new Adamson 4-roll calender is a completely modern Zee-type unit, especially designed for double-coating tire cord or producing two-ply laminated material. The improved features available on this unit greatly increase the accuracy of calendering operations, and assure a more uniform product with substantial savings in material. Higher production speeds can be obtained; and crown compensating equipment provides uniform transverse gage under varying conditions of operation.

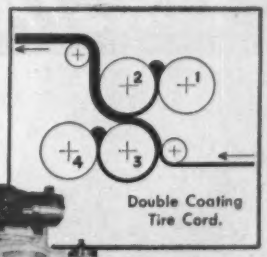
This high-speed unit incorporates a separate pinion gear stand which encloses all drive gears and connecting gears, driving the rolls individually through universal couplings. The peripherally drilled rolls are accurately controlled by a pressurized circulating water temperature regulation system.

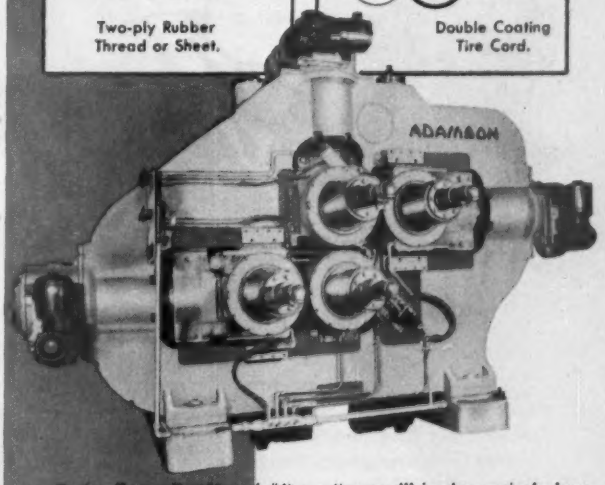
In addition to the unit shown, a modified calender, incorporating crossed axis equipment on only the #1 or the #4 roll is available for plastic film or sheeting. Adamson also manufactures a 24" Zee-type calender, along with a special 6-roll double Zee-type unit.

We invite your inquiries.

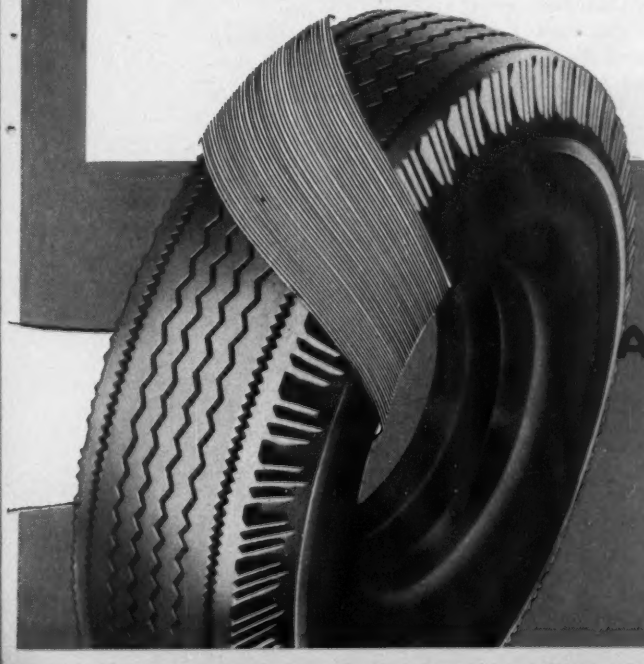
Main drive motor is mounted *between* the calender and pinion gear stand, reducing overall length significantly. Gage adjusting equipment is unitized construction, assuring positive alignment, with double enveloping worms and worm gears mounted in anti-friction bearings.







Both offset rolls (#1 and #4) are "crossed" in the vertical plane by motorized adjustments allowing operator to compensate for deflection of the rolls. The operator can add or subtract crown, in effect, by changing the amount of crossing of the two offset rolls with respect to the two stack rolls. Selsyn equipment and counters are provided for indicating the exact vertical position of each end of the crossed rolls.



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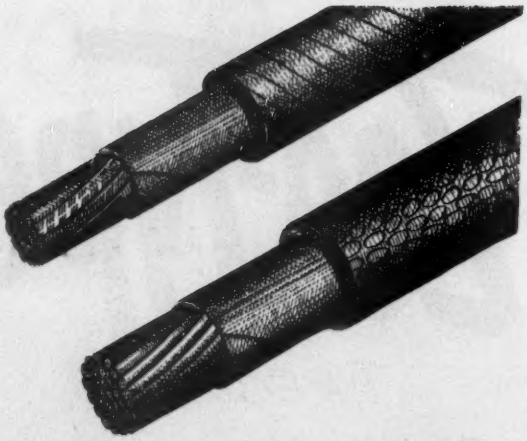
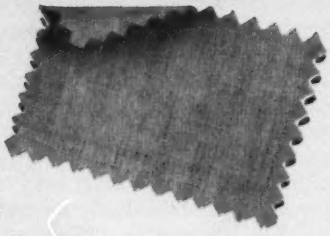
Subsidiary of United Engineering and Foundry Company

Plants at: Pittsburgh • Vandergrift • New Castle • Youngstown • Canton



If it's got to have CONSTANTLY UNIFORM QUALITY...



make it Wellington Sears "Columbus Sheeting"—a superior fabric for rubberizing

One of the most versatile industrial fabrics in the entire Wellington Sears line, Columbus sheeting has long been outstanding for its constantly uniform quality. Yard after yard, this lighter weight fabric is an absolute minimizer of headaches in production and inspection.

Columbus sheetings are made 40 to 120 inches wide in weights from 2 to 5 ounces per square yard. Whether it's for rubberized mechanical goods such as friction tape and cable wrappings, or for such rubber-coated products as hospital sheeting and service raincoats, or any use demanding high quality throughout, you'll find Columbus sheeting a versatile performer for your needs.

Additional Wellington Sears fabrics for coating, specialties and mechanical rubber goods are listed at right. Your nearest Wellington Sears sales office will supply you with full information on your rubber-and-fabric requirements.

An illustrated 24-page booklet filled with valuable facts on fabric development and applications of interest to present and potential users of industrial fabrics is yours for the asking. Write for a free copy of "Modern Textiles for Industry" to Wellington Sears Co., Dept. L-5, 65 Worth Street, New York 13.

Superior Fabrics for the Rubber Industry

- Belting duck
- Hose duck
- Enameling duck
- Army duck
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- Sheeting
- Airplane cloth
- Balloon cloth
- Nylon, high-tenacity rayon, other synthetics and combinations.

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FIRST In Fabrics For Industry

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CONTROL

Dials and recorders keep automatic check on temperatures and pressures throughout General Atlas plants – to guarantee the same pellet perfection, exceptional performance from every shipment of Pelletex.

Control Laboratories at points of manufacture constantly evaluate Pelletex throughout every step of production, maintaining further control of the production process. A central Referee Laboratory, examining periodic production samples, assures uniform testing.

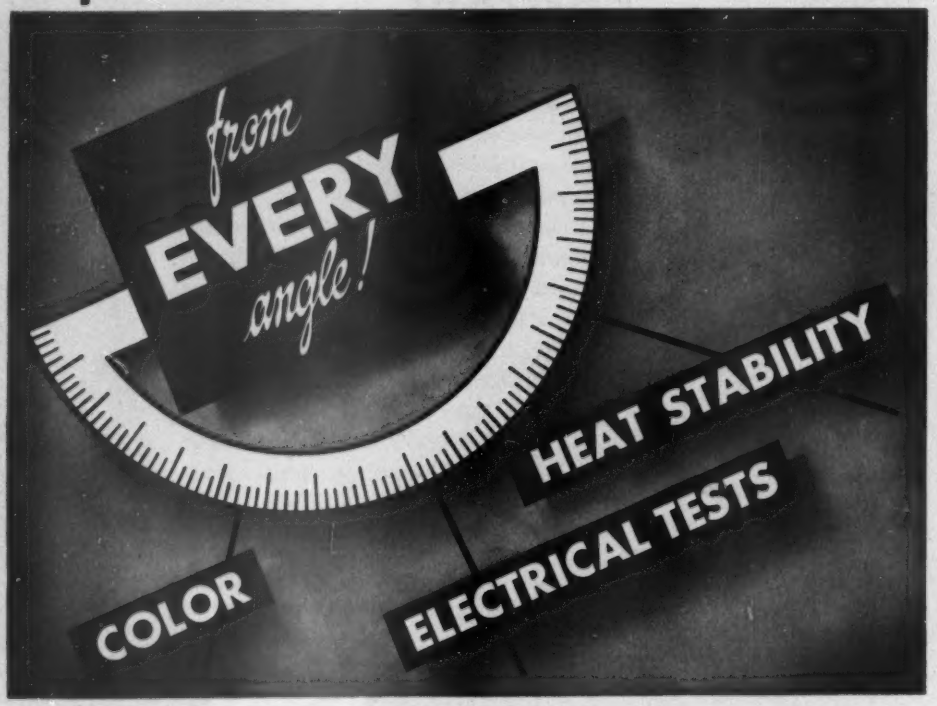
Fully equipped Cabot rubber laboratories test Pelletex rubber compounds on various types of modern testing apparatus.

GENERAL ATLAS DIVISION
of Cabot Carbon Company

GODFREY L. CABOT, INC.
77 Franklin Street
Boston 10, Mass.

CABOT

PELLETEX



PIGMENT NO. 33

for Compounding

VINYLS AND SYNTHETIC RUBBER

Sample and technical data sent promptly on request

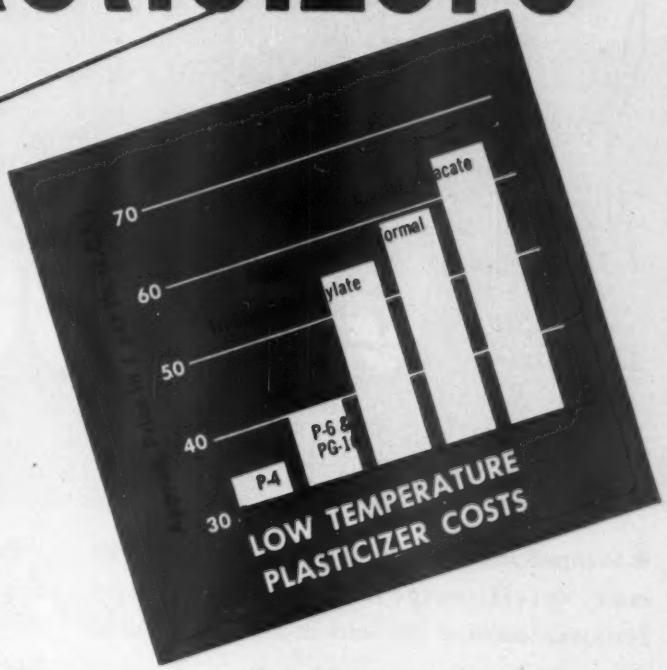
SOUTHERN CLAYS, Inc.

33 RECTOR STREET
NEW YORK 6, N. Y.

HOW TO CUT COSTS ON LOW TEMPERATURE LOW VOLUME SWELL

SYNTHETIC RUBBER Plasticizers

FLEXRICIN® plasticizers are fully equivalent and, in many cases, superior to the commonly used low temperature plasticizers. Added features are their extremely low volume swell in aromatic fuels and excellent recovery on low temperature compression set. Their cost is much lower. Check this graphic comparison and you will see that costs can be cut substantially.



Flexricin Rubber Plasticizers:

PG-16, Butyl Acetyl Polyricinoleate	25% Nitrile Rubber
FLEXRICIN P-4, Methyl Acetyl Ricinoleate	40% Nitrile Rubber
FLEXRICIN P-6, Butyl Acetyl Ricinoleate	Neoprene GN
FLEXRICIN P-4, Methyl Acetyl Ricinoleate	GRS

THE Baker CASTOR OIL COMPANY

120 BROADWAY, NEW YORK 5, N. Y.

LOS ANGELES • CHICAGO

Mail convenient coupon for 1 quart samples and technical data sheets. Please clip to your letterhead.

Baker Castor Oil Company
120 Broadway, New York 5, N.Y.

Please send samples of the Ricinoleate Esters checked or Technical Bulletin.

☐ PG-16 ☐ P-4 ☐ P-6

☐ Technical Data

Name_____

Firm_____

Address_____

_____

RA-73

all in partnership with rubber...

but no two wires alike!

● Pictured above are four typical examples of the many special-purpose wires developed by National-Standard for wire-in-rubber products.

They do have one essential quality in common —a highly developed affinity for adhesion with rubber. But beyond that, each has a different job to do . . . and is painstakingly engineered to do it . . . effectively!

For years National-Standard has specialized in improving the behavior of wire in rubber—digging into all the intricacies of application, fabrication, finish, corrosion, strength, elongation, adhesion and innumerable details you might never bother with.

Main reason for all this research, this "groundwork", is to help you improve your products, increase production, conserve materials and cut costs! Perhaps you now face *new* defense production problems involving wire. Remember, National-Standard service is always at *your* service.

NS
NATIONAL-STANDARD Company
NILES, MICHIGAN

DIVISIONS OF NATIONAL-STANDARD CO.

ATHENIA STEEL	*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD	*Niles, Mich.*	Tire Wire, Fabricated Braids and Tape
REYNOLDS WIRE	*Dixon, Illinois*	Industrial Wire Cloth
WAGNER LITHO MACHINERY	*Jersey City, N. J.*	Lithographing and Special Machinery
WORCESTER WIRE WORKS	*Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes

AND NOW

Cabol 100

CABOT'S NEW Hydrocarbon Oil Plasticizer for Low Cost Vinyl Compounding

- Pound Volume Cost in the Range of Low Cost Inert Fillers
- Plasticizer Efficiency of 1.5 as Compared with DOP Efficiency of 1.0
- Up to 50% Compatibility with Octyl-Phthalate Type Plasticizers
- Available for Immediate Delivery in Commercial Quantities
- Investigate the use of CABOL 100 in your plastics products
- *For samples and further technical information address*

Cabot produces "Cabol 100" used in floor tiles, but does not make the finished product

Plasticizer Division

GODFREY L. CABOT, INC.

77 FRANKLIN ST., BOSTON 10, MASS.

CABOT

"National security is impossible without financial security of individual citizens..."

FRED MAYTAG
The Maytag Company

"Ingenious research and the ability to produce . . . which have helped to make the United States the world's greatest nation . . . could not have been realized without the savings of millions of thrifty persons. Savings of individuals financed new inventions, developed others. The Payroll Savings Plan for purchasing Savings Bonds regularly provides an easier way for American workers to save for future spending or investment, for their own security, and for their nation's security. Our experience at the Maytag Company has shown us that a successful Payroll Savings program can be the foundation and the cornerstone of happy employee relations."

Let's point up Mr. Maytag's concise summary of the Payroll Savings Plan with a few very recent figures:

• at the close of February, 1953, the *cash value* of Series E Bonds held by *individuals* reached a new high: $35.5 billion. This is $1 billion more than the value of the Bonds held on May 1, 1951, when E Bonds began to mature.

• to this encouraging reservoir of future purchasing power, 8,000,000 Payroll Savers are adding $160,000,000 per month by their consistent investment in U.S. Savings Bonds.

• unit sales of E Bonds in 1952 reached the highest level of the past six years—more than 77 million individual pieces. Of the 77 million units, 67 million were in the $25 and $50 denominations—the bonds bought chiefly by Payroll Savers.

• Payroll Savers are serious savers—of the approximately $6 billion Series E Bonds which had become due up to the end of March, $4.5 billion, or 75%, were retained by their owners beyond maturity.

If you are not among the 45,000 companies that make the benefits of the Payroll Savings Plan available to their employees . . . or if you do have a Plan and your employee participation is less than 50%, a telegram or letter to Savings Bond Division, U.S. Treasury Department, Washington Building, Washington, D. C., will bring you all the information and assistance needed to build a *good* Payroll Savings Plan.

The United States Government does not pay for this advertisement. It is donated by this publication in cooperation with the Advertising Council and the Magazine Publishers of America.

Rubber Age

To Serve The South!

AIR VIEW OF MEMPHIS
Memphis Chamber of Commerce

United Carbon Company, Inc., announces the opening of a branch office in Memphis, Tennessee. This step was made in order to give the greatest service to the growing rubber industry in the southland. This office is located in Suite 2907-08, Sterick Building.

UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

NEW YORK • AKRON • CHICAGO • BOSTON • MEMPHIS

CANADA: CANADIAN INDUSTRIES, LIMITED

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UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

NEW YORK • AKRON • CHICAGO • BOSTON • MEMPHIS

CANADA: CANADIAN INDUSTRIES, LIMITED

Grandfather had a hard life . . .

Cycle tyres stuffed with horsehair and cobbled streets must have made life a bit uncomfortable for Grandfather. Since the introduction of pneumatic tyres, we have kept full abreast of every development and today we are the leading manufacturers of cycle tyre producing equipment in the World.

SHAW

machinery for tyre and tube production

Shaw-McNeil 40-34-34 Twin Bag-o-matic Curing Press for Cycle Tyres. Supplied complete with motor and controller, time cycle controller—ready for connection to service lines.

FRANCIS SHAW AND COMPANY LIMITED MANCHESTER 11 ENGLAND

TELEPHONE: EAST 1415/8 TELEGRAMS: CALENDER, MANCHESTER

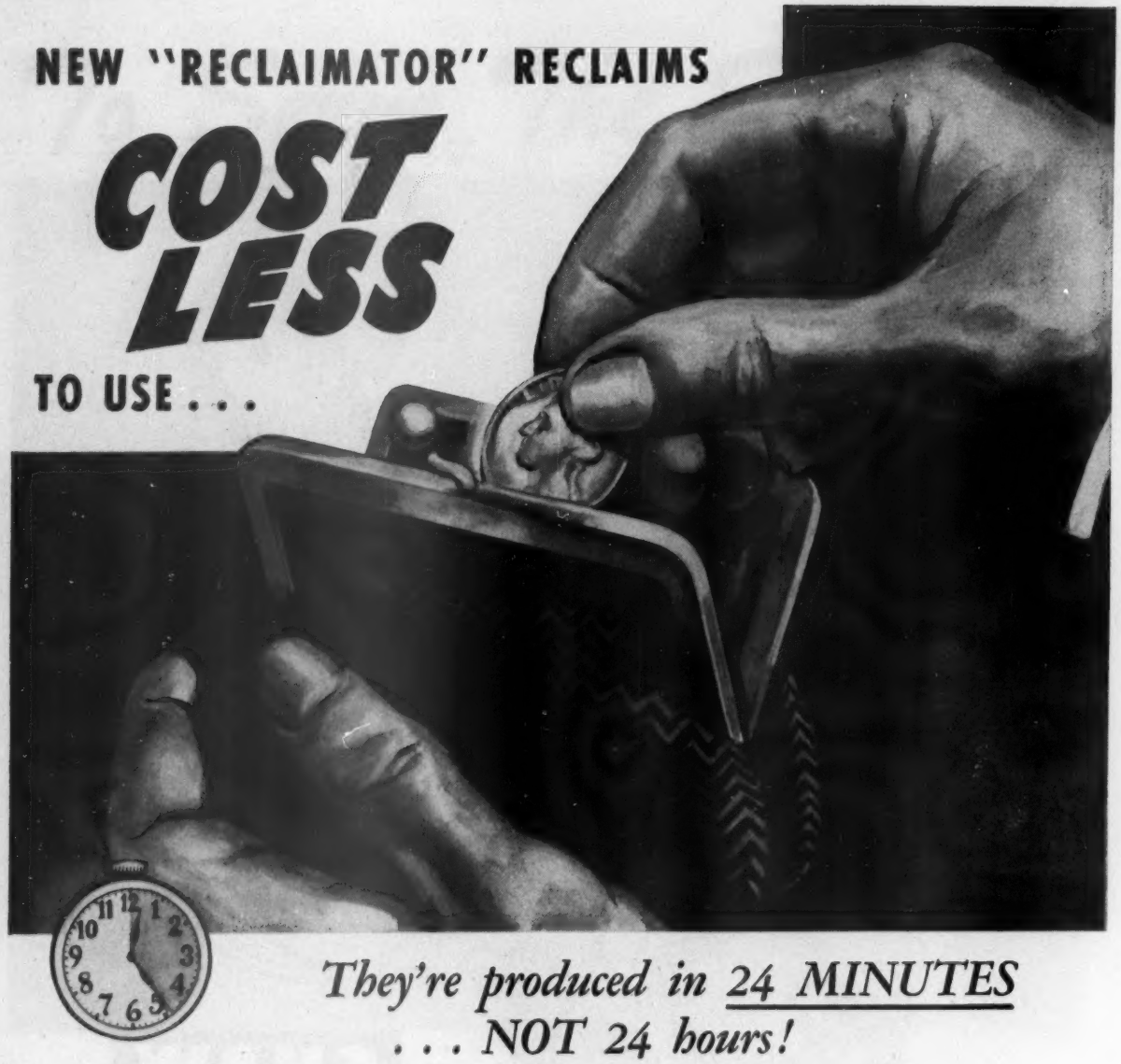
LONDON OFFICE: 34 VICTORIA STREET LONDON SW1 PHONE: ABBEY 1800 GRAMS: VIBRATE PHONE LONDON

Rooster 2854

NEW "RECLAIMATOR" RECLAIMS

COST LESS

TO USE . . .



They're produced in 24 MINUTES . . . NOT 24 hours!

WITHOUT SACRIFICE OF QUALITY, you can now *profitably* use this amazing new type of reclaim to make *most* rubber products EASIER, FASTER and CHEAPER.

Because of the extremely short cycle in which the compound is in process, MORE of the *original quality* of the rubber is retained. This means greater abrasive wear, more resistance to heat and ozone and better aging for your finished product.

More uniform, less scorchy and with correct tackiness, these new U. S. RECLAIMS permit bigger Banbury loadings, FASTER mixing and higher loadings of reinforcing fillers and softeners. From bead to cap for tires and for producing high grade camelback, specify our R-575 and for all molded mechanical rubber goods, ask for R-351. Write, call or wire us for details on this new type of money-saving reclaim.

Always keep reclaims in your formula and always look to U. S. for the best. U. S. Rubber Reclaiming Company, Inc., P. O. Box 365, Buffalo 5, N. Y. Trenton agent: H. M. Royal, Inc., 689 Pennington Ave., Trenton, N. J.

U.S. *70 years serving the industry solely as reclaimers*

U.S. RUBBER RECLAIMING COMPANY, INC.

EFFECT OF OZONE EXPOSURE ON ELASTOMERS (135 P.P.M. OZONE)

	DEGREE OF EXTENSION	BEHAVIOR IN OZONE
ELASTOMER "A"	65%	FAILED, 35 MINUTES
ELASTOMER "B"	25%	FAILED, 39 MINUTES
"HYPALON"	200%	NO EFFECT AFTER 3½ HRS.

OZONATOR TESTS SHOW

A Wallsbach "Ozonator" was used to create ozone concentrations up to 135 parts per million at a test temperature of 158°F. Tests were conducted on specimens clamped around mandrels, and on strips mounted on racks.

DU PONT HYPALON*

CHLOROSULFONATED POLYETHYLENE

has Complete Ozone Resistance

The complete ozone resistance of Du Pont "Hypalon" chlorosulfonated polyethylene suggests a wide variety of uses in the rubber industry—for "Hypalon" alone, as well as in blends with other elastomers. White sidewalls for automobile tires need the resistance to cracking that this ozone resistance gives. Other uses indicated by this property of Du Pont "Hypalon" include automotive weather-stripping, coated fabrics, spark plug boots and wire covering.

And ozone resistance is only one of a unique combination of properties "Hypalon" offers. These properties point to such varied uses as electrical insulation and jacketing, footwear, floor covering, conveyor belt covers, gaskets, O-rings, diaphragms, linings for chemical handling equipment, acid hose, steam hose coverings and molding forms and bags.

Perhaps Du Pont "Hypalon"—or a blend containing "Hypalon"—can help you develop a new or improved product. "Hypalon" is now available in limited commercial quantities.

ONLY "HYPALON" OFFERS *ALL* THESE OUTSTANDING PROPERTIES

- **COMPLETE OZONE RESISTANCE**
- **EXCELLENT ABRASION RESISTANCE**
- **EXCELLENT WEATHER RESISTANCE**
- **GOOD HEAT RESISTANCE**—Suitable for continuous service up to 250°F. and intermittent service at higher temperatures.
- **EXCELLENT CHEMICAL RESISTANCE**
- **UNLIMITED COLOR POSSIBILITIES.** Does not require carbon black to achieve maximum physical properties.
- **EXCELLENT FLEX-LIFE**

*REG. U. S. PAT. OFF.

DU PONT
REG. U. S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING ...THROUGH CHEMISTRY
Polychemicals
DEPARTMENT
PLASTICS • CHEMICALS

FOR FURTHER INFORMATION: Send today for technical literature on the properties, applications and compounding of Du Pont "Hypalon." Or if you prefer, a Du Pont technical representative will call at your convenience.

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Dept. 637, Du Pont Bldg., Wilmington 98, Delaware

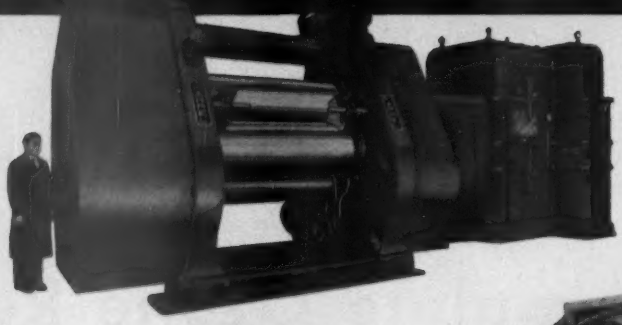
I am interested in "Hypalon" for _____. Please ( ) send me literature. ( ) Have your technical representative call.

*Name*_____ *Title*_____

*Firm*_____

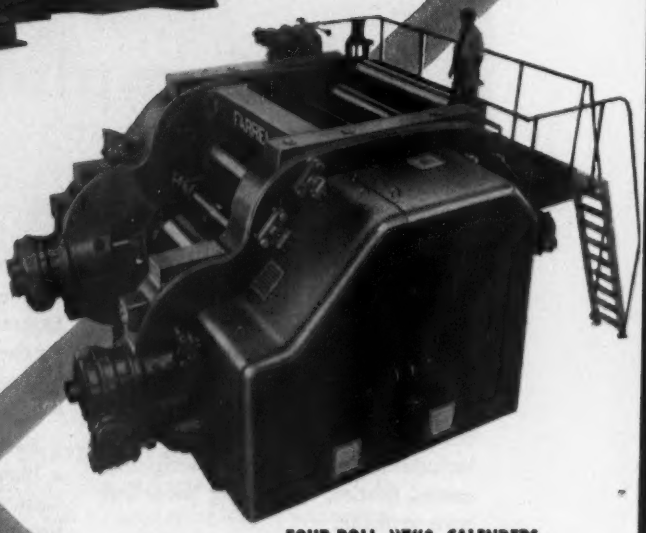
*City*_____ *State*_____

What is new in RUBBER and PLASTICS Processing Machinery?



THREE-ROLL TRI-ANGULAR* CALENDERS

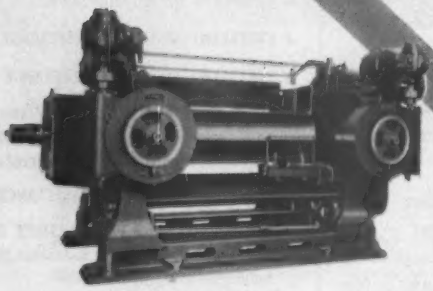
The machine of the future for any type of production requiring two calendering passes. Right-angle arrangement of rolls provides closer control of gauge and easier feeding conditions.



FOUR-ROLL "Z"* CALENDERS

A leading rubber company, in describing its new Farrel-Birmingham "Z" calender train for double-coating tire fabric, says that it "insures unmatched uniformity of quality."

These machines have proved to be equally outstanding for the high-speed production of rubber and plastic film and sheet, and for single coating. Their unique roll arrangement, crossed axes device and other features permit finer control of gauge.

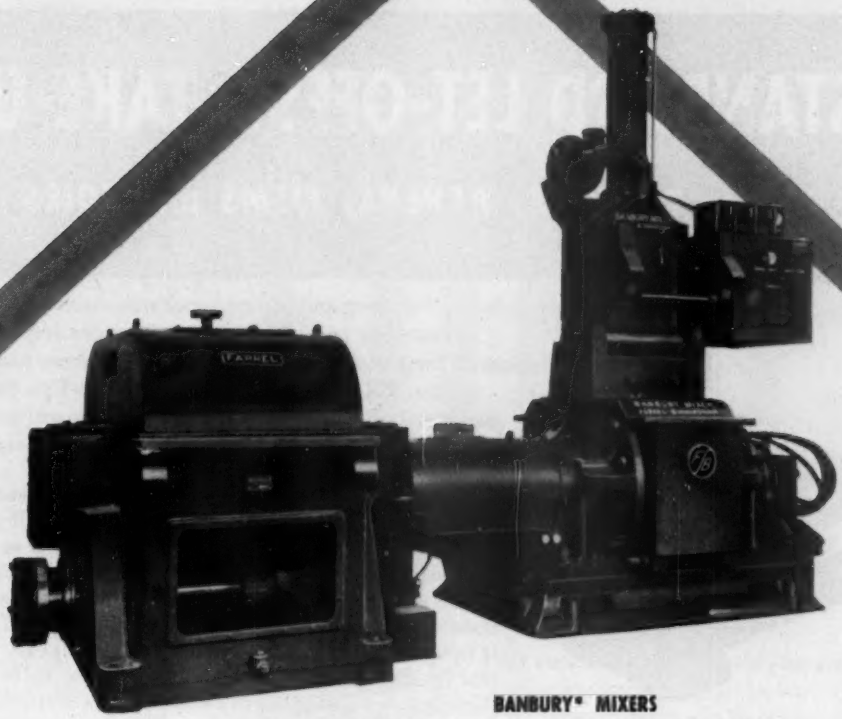


ROLL MILLS

Farrel-Birmingham mills for mixing, grinding, warming and sheeting are built in a complete range of sizes, from 6" x 13" for the laboratory up to 28" x 84" heavy-duty machines for the factory. For special requirements, variations in designs are obtainable, often from existing plans.

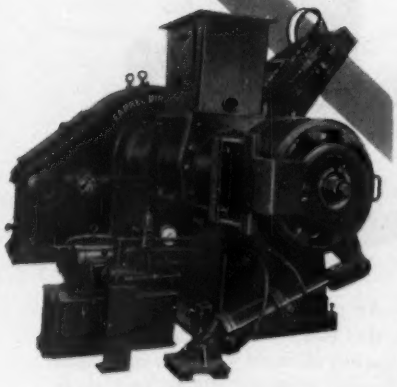
GIANT CRACKER

With 32" x 54" rolls, this is the largest and most powerful cracker ever built for the rubber industry. It is capable of grinding whole tire carcasses at a rate of 10,000 to 15,000 pounds per hour. The rubber is stripped clean of the bead during the process.



BANBURY* MIXERS

The development of greater efficiency in the Banbury mixer is a continuing process at Farrel-Birmingham. Recent outstanding improvements, which include the Unidrive, make possible faster mixing, better quality and lower production costs.



EXTRUDERS

Designed to receive stock directly from a Banbury and discharge into a calender or other processing unit, these machines require no operator. Stock is strained and extruded, or extruded without straining, in a continuous strip of uniform thickness and width.

As the world's largest manufacturer of machinery for processing rubber and plastics, Farrel-Birmingham has made many outstanding engineering contributions to the efficient conversion of raw material to finished or semi-finished product.

Among recent developments are the four-roll "Z" calender and the three-roll *Tri-angular* calender. Originated and developed by Farrel-Birmingham engineers, both of these designs are establishing new standards for accuracy and economy in calendering.

Other types of machines, such as Banbury mixers, mills, crackers and extruding machines, are constantly being modified and improved in design to increase production efficiency and reliability of operation.

Write for further information about any of the equipment mentioned on this page. Descriptive literature will be sent to you without cost or obligation.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

F-B PRODUCTION UNITS

Banbury Mixers • Plasticators • Pelletizers • Extruders • Calenders • Mixing, Grinding, Warming and Sheeting Mills • Refiners • Crackers • Washers • Hose Machines • Bale Cutters • Hydraulic Presses and Other Equipment for Processing Rubber and Plastic Materials

FB-831

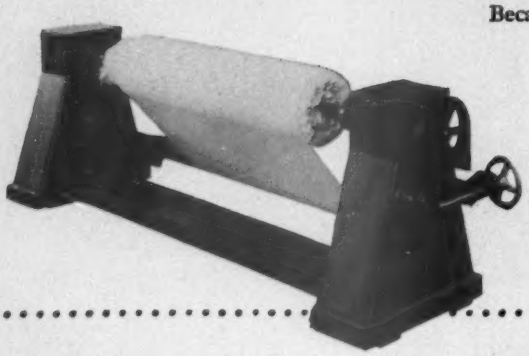
Farrel-Birmingham®

*Trade-marks of Farrel-Birmingham Company, Inc.

IOI STANDARD LET-OFFS and TAKE-UPS

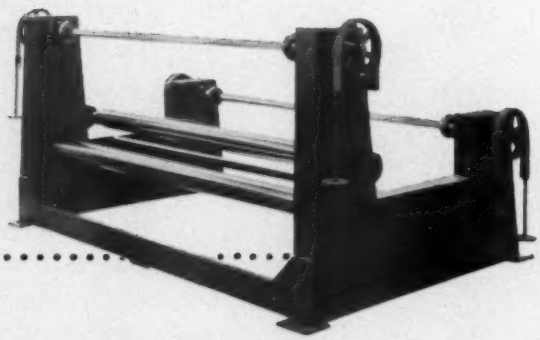
for TEXTILES, PAPERS, FILMS and FOILS

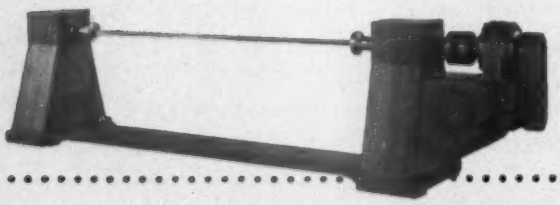
● In continuous handling and processing of web materials, proper unwinding and winding are of utmost importance. Because of their advanced engineering and accurate construction, IOI standard Let-Offs and Take-Ups provide the precision and control so essential to end-product quality in these operations.



Single Roll Friction-Type Let-Off—This IOI Let-Off provides a convenient method of holding tension on a mill roll of fabric or paper being fed into a system. The stand is so arranged to also provide for quick roll changes in minimum time. Construction is of fabricated members welded to a base, affording the same ruggedness as all other IOI products. Brake adjustment is by manual handwheel control, and affords easy tension control by the operator. These stands can also be furnished at a slightly lower cost by use of counterweighted friction holdback.

Dual Roll Friction-Type Let-Off—This IOI Let-Off provides a convenient method of continuously feeding rolls of fabric or paper at moderate speeds and tensions. Accurately machined slide retainer ring-type mandrels, simple tension devices, and accessibility to the unwinding rolls are but a few of the IOI design features. The friction holdback can be provided with either handwheel or counterweight control, as in the single roll stand, or with air friction-type clutch.





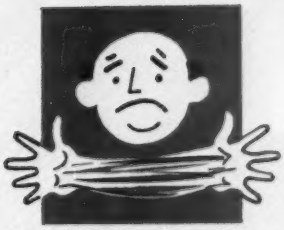
Single Roll Take-Up—An efficient windup stand of the bullhead pedestal type, this IOI system has the necessary provision for the application of wide varieties of system drives. The base, bullheads, winding shafts, and shaft mountings duplicate the unwinding stands. The drive illustrated is controlled by a tension unit which integrates the speed of the winding roll shaft in direct proportion to the roll diameter buildup. These stands are also used in tandem with a tension control accumulator and pull-out rolls to provide continuous winding.

These standard units (with or without drives) are available now, ready for prompt shipment. For complete information write:

INDUSTRIAL OVENS, INC.

13825 TRISKETT ROAD CLEVELAND 11, OHIO

DRY *but profitable facts about* SILENE



Columbia-Southern Silene — a finely divided precipitated calcium silicate—is widely known as an excellent and economical rubber reinforcing pigment. It is used extensively for such goods as soling, wringer rolls, drug sundries, mechanical and molded goods. But don't limit your thinking of Silene to reinforcing alone, because Silene has other extraordinary characteristics that may prove of real value to you in compounding.

The very fine particle size of Silene gives it unusual surface area and absorptive powers. Consequently, a few parts of Silene can be effective in drying up a sticky or gummy reclaim stock, for example, to a workable consistency.

Or, Silene can be used for changing liquid or gummy accelerators, or other compounding ingredients, into dry powders.

Or, Silene can be added to certain dry ingredients to increase flowability or prevent caking of the material in storage or handling.

If you think Silene can be of use in your operations . . . we shall be happy to supply you with experimental quantities and to offer our technical assistance.

IS YOUR COLUMBIA-SOUTHERN SILENE DATA UP-TO-DATE?

Much of our previously published Silene data has been revised and condensed. If you are interested in obtaining our new bulletin, write today, asking for Silene Bulletin No. 2.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

420 FORT DUQUESNE BOULEVARD, PITTSBURGH 22, PA.

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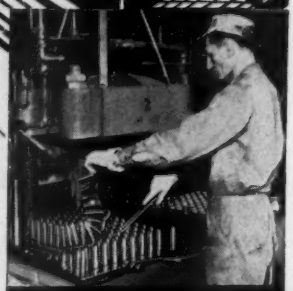
DOW CORNING Mold Lubricants Add Sales Appeal

"Show 'em and sell 'em!"

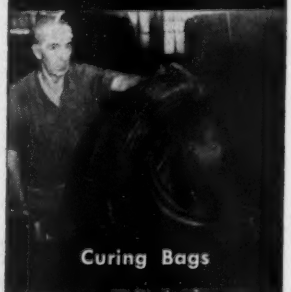
Experienced salesmen know that product appearance is often the deciding factor in successful selling. And experienced pressmen know that clean, easy release is a deciding factor in successful production.

Get 'em both with Dow Corning silicone mold lubricants. Your molds stay cleaner longer, and they produce parts with a high glossy finish that's bound to mean greater customer appeal. That's because these silicone release agents can't break down at molding temperatures to form a carbonaceous build-up. Non-flammable and non-corrosive, they help cut mold cleaning costs as much as 80%. Scrap is reduced to the vanishing point.

Specify Dow Corning silicone mold release agents today. Fluids for green carcass, bead and parting line release; emulsions for molds, mandrels and curing bags.



Deep Cavity Molds



Curing Bags

Heavily Loaded Stocks

Dow Corning Silicones Mean Business!

For more information, call our nearest branch office or write direct for data sheet CM-7.

DOW CORNING SILICONES

DOW CORNING CORPORATION
MIDLAND, MICHIGAN

ATLANTA CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D. C. (Silver Spring, Md.)

In Canada: Fiberglas Canada Ltd., Toronto In Great Britain: Midland Silicones Ltd., London

where | uniformity
precision
dependability are factors

specify
UNITED Rolls

for processing
rubber
plastics paint
tile linoleum
and other non-metallic
materials

Roll making has been an important part of our business for 50 years.

Through research and development in roll design and manufacture, we have made important contributions to greater uniformity and accuracy in the product of rubber and other non-metallic processing machinery.

Our engineers specialize in the design of rolls for new or unusual requirements as well as for standard applications. Why not consult them on your next roll requirement?

UE&FCO

UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at { Pittsburgh • Vandergrift • New Castle
Youngstown • Canton

Subsidiaries: { Adamson United Company, Akron, Ohio
Lobdell United Company, Wilmington, Delaware
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

Looking for a Zinc Oxide free of AGGREGATES?

Do you want . . .

- a zinc oxide without aggregates?
- a zinc oxide with the particles insulated from each other by a special coating that promotes excellent dispersion in rubber?
- a zinc oxide of higher apparent density that increases Banbury capacity?

*TRY PROTOX-166**

- It is free of aggregates.
- It is made by a patented process that disperses aggregates.
- Its individual particles are coated with zinc propionate— an outstanding dispersing agent.
- It mixes fast
  —cuts mixing costs
- It disperses well
  —provides high efficiency of zinc oxide
  —gives more freedom from tear centers

These are some of the reasons why Protox-166 is one of the most widely used grades of zinc oxide in the rubber industry. If you have not yet tried Protox-166, discover its advantages in your compounds by running a trial lot.

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

. . . most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

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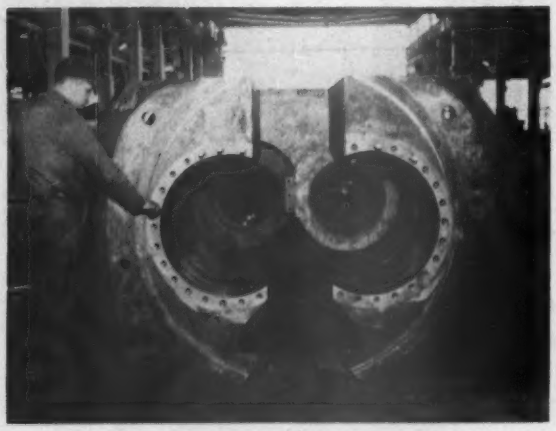

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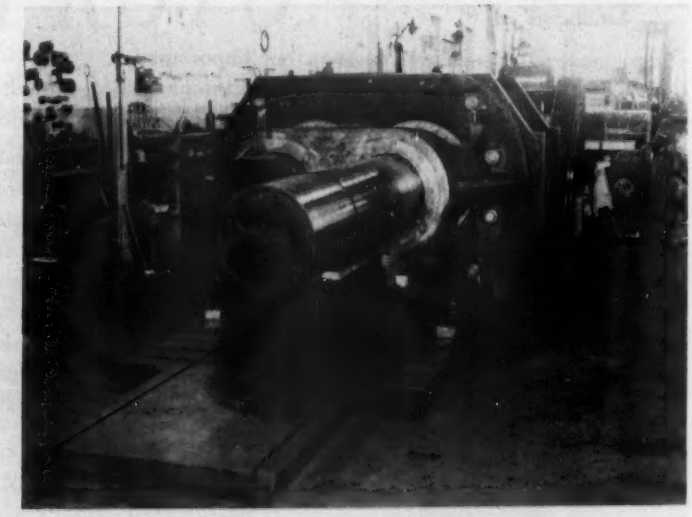

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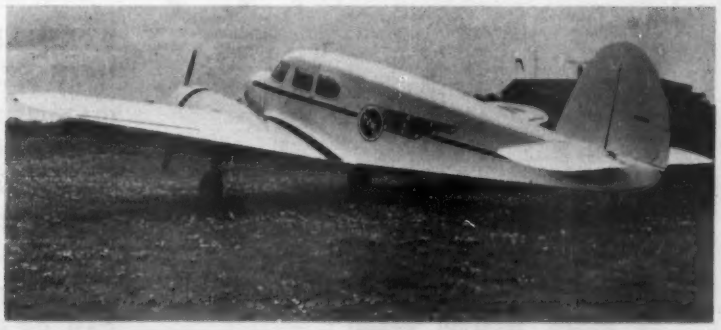

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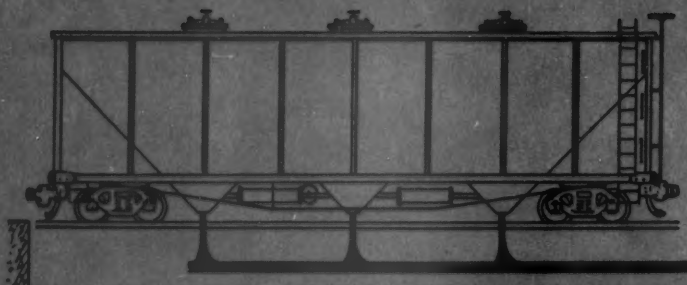

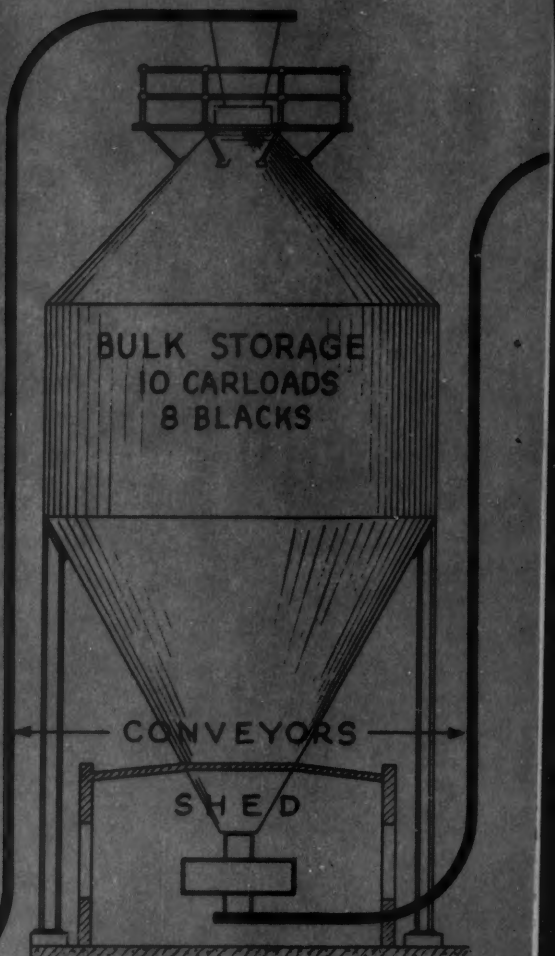

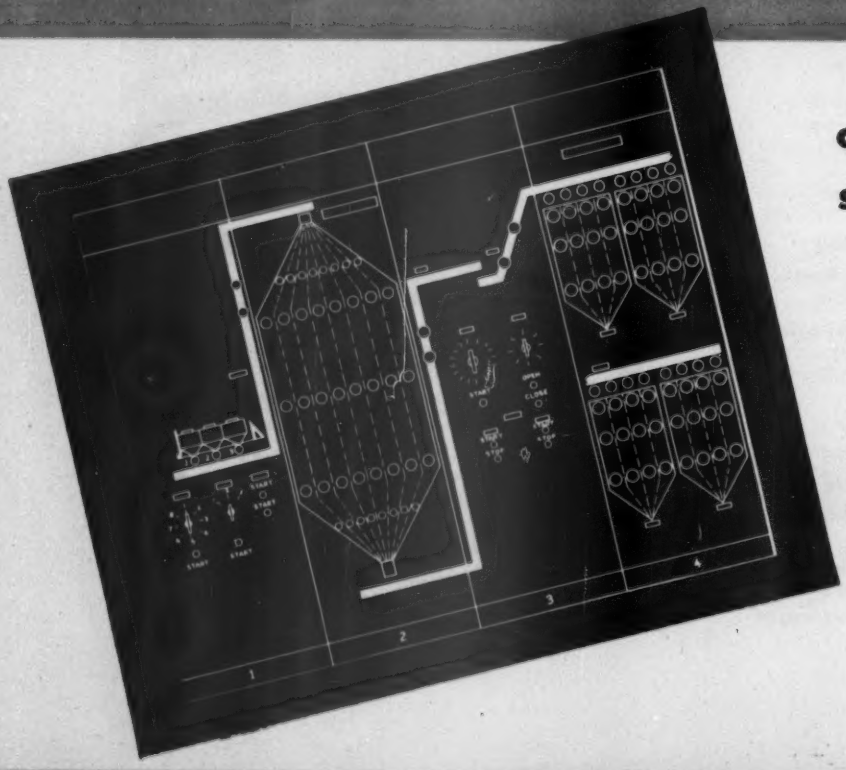

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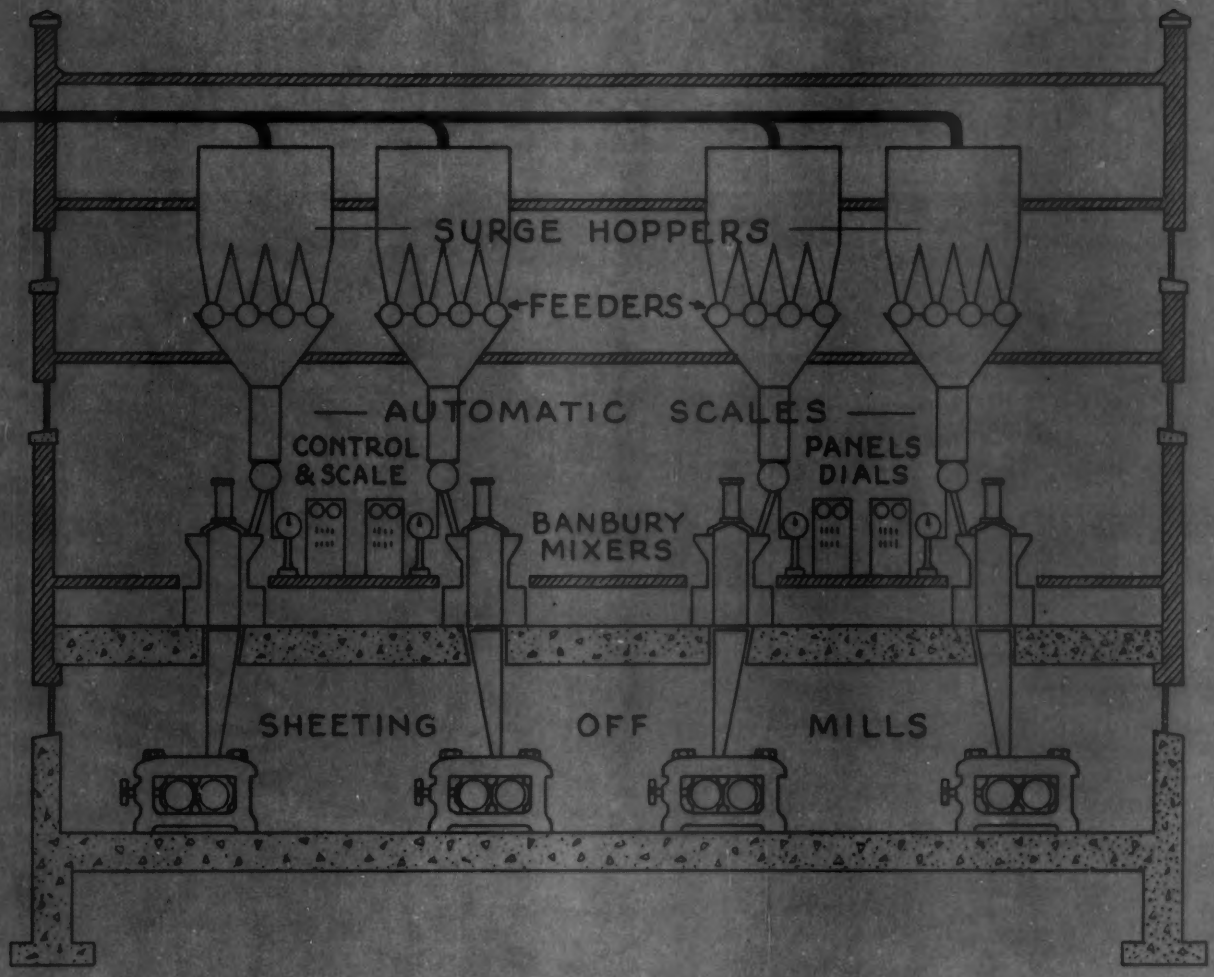

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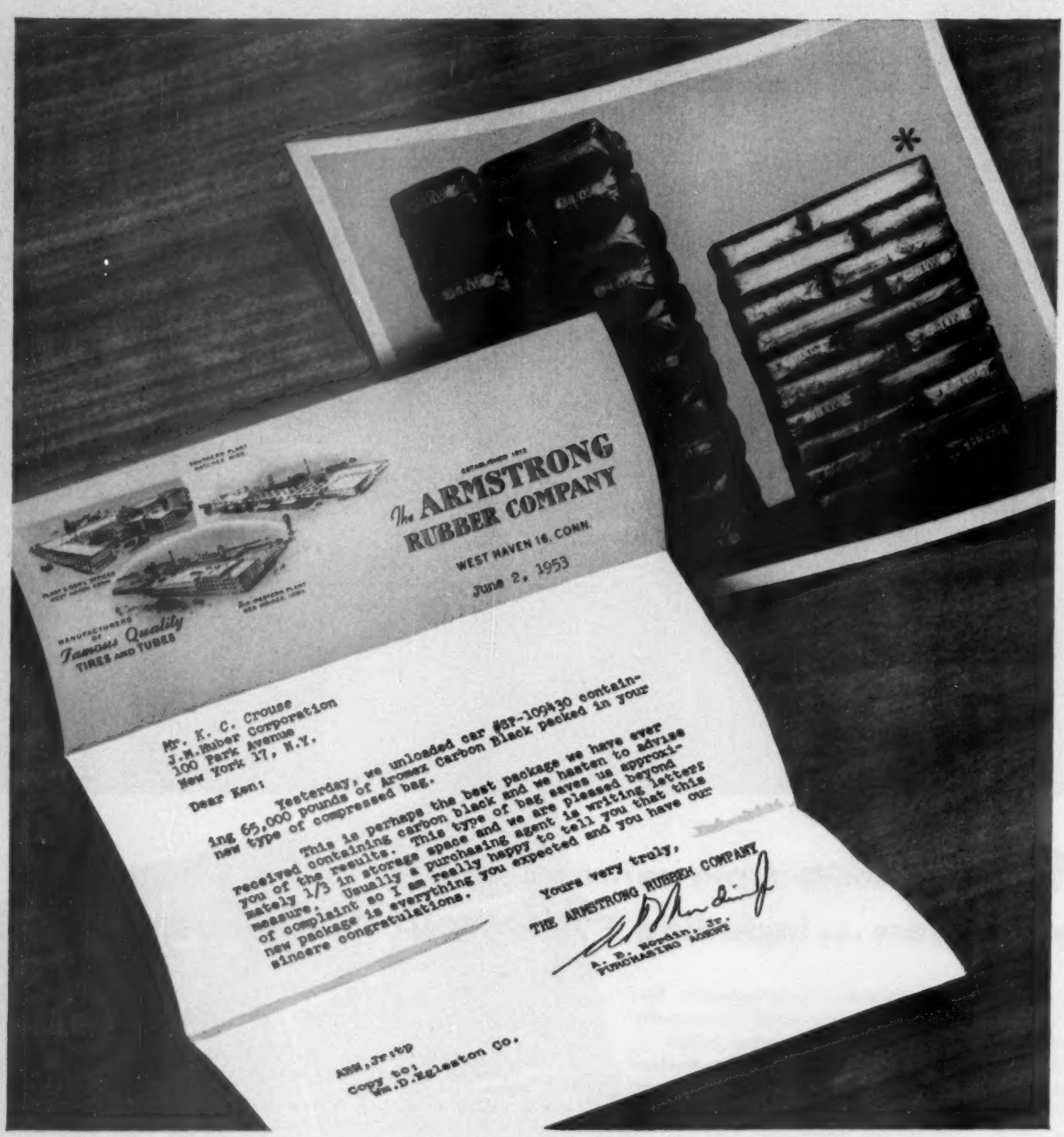
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Bonding Methods for Adhering Rubber to Metal

By J. H. GERSTENMAIER

Development Manager, St. Marys Manufacturing Division, Goodyear Tire & Rubber Co., St. Marys, Ohio

THE old familiar question, "Can rubber be bonded to metal?", now can be answered "Yes" by the rubber product manufacturer. Rapid development of the rubber industry's manufacturing methods used to adhere rubber to metal during vulcanization for molded rubber products has taken place during the past fifteen years, resulting in manufacturing processes which now provide satisfactory bonds.

Not too many years ago only natural rubber could be bonded to steel or cast iron, and then only under restrictive conditions of metal surface and composition and on a hit-or-miss basis. At the beginning of World War II, aluminum presented problems of bonding that almost eliminated integral rubber-aluminum products from the realm of practical manufacturing. Today, steel, aluminum, stainless steel, die cast metals, magnesium, titanium, and almost all other alloys or basic metals can be bonded to natural or synthetic rubber, with bond strengths sufficient to satisfy practically all operational requirements.

This is not to say that the manufacturing techniques used to obtain these bonds have become simple or that high strength adhesions are obtained readily and reproduced easily. In fact, herein lies today's problem in this field. The rubber technologist, faced with the question, "Can this (specific) rubber be bonded to this (specific) metal?", begins his work realizing that a satisfactory bond can likely be obtained, but he is faced with a seemingly endless array of possible combinations of manufacturing methods and adhesive materials which must be considered to assure results which will most adequately satisfy the finished product specification and use. Each type of natural or synthetic rubber may demand a different manufacturing procedure or bonding material, and each different metal will require individual consideration. No universal method or no all-purpose cement has been developed; therefore, each combination of materials presents its own problems and resultant bonding procedures.

Obtaining a satisfactory bond is only the first consideration because the further requirement that the bond be produced readily in quantity on a consistent basis is equally important. Here the problem becomes more complex because many parts cannot, by the nature of their design, be inspected or tested for adhesion, and the producer and customer must place complete dependence for bond strengths upon the level of uniformity indicated by the adhesion process used and on spot check quality control procedures.

Type of Adhesions

It has been established that there are two basic types of adhesion methods in use today for obtaining bonds between uncured rubber and metal. These are referred to as chemical and mechanical, and in both methods the

Note: This paper was presented at the 21st Annual Meeting of the American Society of Tool Engineers, Detroit, Mich., March 18-20, 1953.

FIG. 1—Automatic brass plating, with plated inner truck engine mount metals at front and brake pedal pad metals at rear.

actual adhesion between the rubber and the metal takes place while the product is in the mold being formed and cured under approximately 300° to 350° F. temperature and 2500 to 10,000 psi cavity pressures.

The chemical type of adhesion is developed through the attraction of atoms or molecules capable of forming a stable compound themselves. Many rubber companies use a carefully controlled (approximately 30% zinc, 70% copper) brass plate as a covering on metals to provide a method of obtaining adhesion to rubber. The brass plate method (Fig. 1) is classified as a chemical type of bond because during the curing cycle the brass plate reacts with certain ingredients of the compounded rubbers to form another chemical composition at the surface of the metal which provides a strong bond between the rubber and the metal. This method has wide usage in the rubber industry and is recommended highly for providing a consistent and dependable method of obtaining satisfactory bonds which will withstand a wide variation of operating conditions.

The other general classification of mechanical or physical type of adhesions is so-called because there is no chemical change in the adhesion surface, and the bond between the rubber and metal is obtained by the use of special cements where the adhesive penetrates the surface to be joined and, upon hardening, forms the bond.

Adhesive-type bonds require carefully controlled manufacturing processes. The adhesive is brushed, sprayed, or dipped on the metal which is carefully cleaned in a prior operation (Fig. 2). The age, viscosity, and general condition of the adhesive is critical and must be controlled, and the application and drying of the adhesive must be regulated carefully. In addition, many of the adhesives are unstable in humid air and must be covered immediately with another more stable rubber cement.

The mechanical-type adhesions present the greatest variety of types of adhesives and manufacturing techniques. These processes are required for different combinations of natural or synthetic rubber and for different metals where brass plating is not adaptable. There are many different adhesives now available to the rubber industry, but in no one case will any single adhesive function equally well for different combinations of metal and rubber. Conversely, it is found that in order to meet the wide variety of product or manufacturing vaiations, many different types of adhesives must be used. The following basic adhesives are used to obtain mechanical adhesion between rubber and metal; in addition there are many chemical variations of these adhesives designed to satisfy specific product conditions:

(1) *Chlorinated Polymers*: These are formed from various polymers by chlorination of the material in solution. One of the original adhesives in the field of mechanical bonds was a resin made by chlorinating natural rubber. Later, similar special-usage adhesives were made by chlorinating various different synthetic rubbers. Generally, this type of adhesive is the workhorse in the field, providing adhesives designed to adhere to many types of natural and synthetic rubber and to ferrous and nonferrous metals.

(2) *Rubber Resins:* This class of adhesives is formed in a manner similar to that of synthetic rubber. As a result of copolymerization, a class of special resins is formed which functions for special usages.

(3) *Cyclized Rubbers:* These materials are formed by the cyclization of natural or synthetic rubbers by means of tin tetrachloride or similar materials.

(4) *Phenolic Resins:* This class of materials is com-

FIG. 2—Aluminum aircraft mount bell metals at beginning and end of bonding cycle.

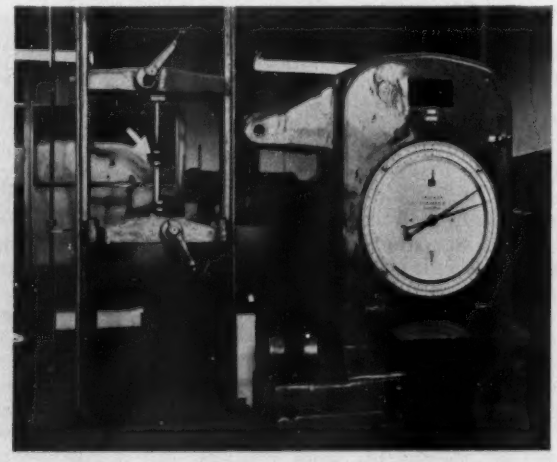


FIG. 3—Rubber-to-steel bond in ASTM tension pull test.

prised of phenol formaldehyde complexes. This group of adhesives is very useful for obtaining bonds between Buna N type synthetic rubber and metal or plastic.

In addition to the use of adhesives that are applied to the metal or to the rubber, there are special cases where successful adhesions can be accomplished by chemically treating the surface of the metal and/or the rubber. By such a method the treatment of the metal surface with isocyanate and persulfates has resolved very difficult adhesion problems. An example of this method is the bonding of Butyl synthetic rubber to brass stems in the production of tire tube valve stems.

Methods of Evaluating Adhesions

There are three methods of evaluating adhesions which are widely used throughout the industry:

(1) *ASTM Button Tension Pull Method—ASTM D429-47T:* For this test a 1.59-in. diameter by ½-in. thick cylinder of rubber is bonded between two ⅜-in. thick circular steel plates (Fig. 3). A steadily increasing direct tension pull load is applied to the two plates to test the bond strength. While this method is used widely, it tends to give exaggerated adhesion strength values and the strip test gives more reliable bond evaluation.

(2) *Strip Test—ASTM 429-47T-B:* In this test (Fig. 4), a strip of rubber 1-in. wide x 8-in. long x ¼-in. thick is pulled from the metal to which it is bonded. The rubber is cut at the bond until enough is free to get a grip, and then the pull on the rubber is maintained at 90 degrees from the metal. This type of test gives a better evaluation of the true bond strength, but since the pulling force is applied effectively at a 1-in. wide line, the pull test values are much lower than for the direct-tension button test on which the tension bond stress is uniformly distributed over the two-square-inch area. As a direct comparison, the bond destruction pull of a certain type of compound, cement, and metal preparation for a button may be as high as 500 to 1000 psi, indicating an excellent adhesion, whereas the comparable test on the same compound, cement, and metal preparation is 100 pounds on a 1-in. wide strip. The strip test gives results which are more dependable.

(3) *Destruction Pull Tests:* The third method of checking adhesion is by destruction pull tests (Fig. 5) on actual parts. A common production procedure is to conduct quality control spot checks daily on functional parts such as engine mounts.

In some instances, where extremely high adhesion values are required and the design of the part lends itself to such an operation, the parts are actually 100% pull tested to a given load (Fig. 6) to screen out pieces on which the bond strength is inadequate. This is a costly operation, and under certain conditions does not eliminate questionable bonds which may pass the 100% static test but fail in actual use. For the average well designed part, a quality control spot check is adequate if the adhesion methods are proven consistent and adequate.

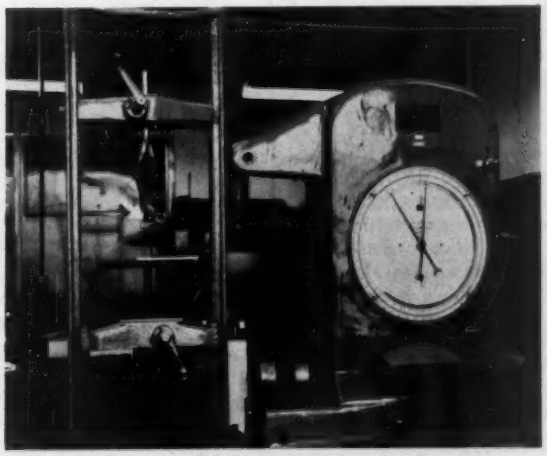


FIG. 4—Rubber-to-metal bond in strip adhesion test.

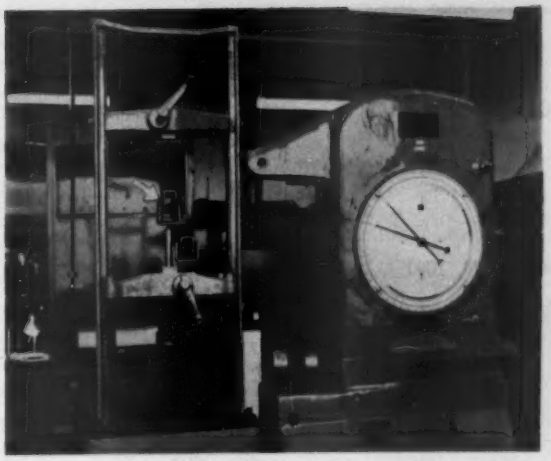


FIG. 5—Destructive adhesion test on finished engine mount.

Adhesion Methods for Typical Products

The engineer faced with the problem of designing a part which will require rubber bonded to metal is provided with a wide variety of materials to consider for its fabrication. The various types of metals have been known and generally used by the designer as common engineering materials. In addition, the various classifications of natural and synthetic rubber now also offer

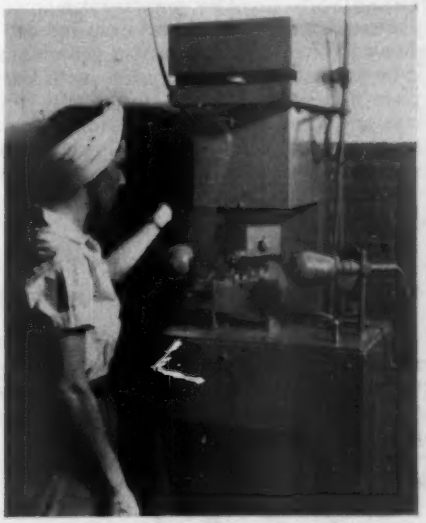


FIG. 6—Non-destructive adhesion test on finished engine mount.

TABLE I—APPLICATION DATA FOR BONDING RUBBER TO METAL

	Type Rubber	Strip Test Bond Strength (lbs./in.)	Adhesion Method	Type Rubber	Strip Test Bond Strength (lbs./in.)	Adhesion Method	Type Rubber	Strip Test Bond Strength (lbs./in.)	Adhesion Method	Type Rubber	Strip Test Bond Strength (lbs./in.)	Adhesion Method
SAE 1010, 1020 Steel	Natural Rubber	90	A-1	GR-S	70	A-1	Buna-N	50	B-4	Neoprene	70	A-1 or B-2
Hardened Steel		50	B-1		40	B-2		30	B-4		40	A-2 or B-2
Malleable Iron		60	B-5		50	B-2		40	B-5		50	B-1
Cast Steel		75	A-2		60	A-2		40	B-5		40	A-2 or B-2
Cast Iron		40	B-1		30	B-2		30	B-5		30	B-1
Type 303 Stainless Steel		70	B-5		60	B-3		—	——		50	B-4
Brass		80	A-1		60	A-1		20	D-1		30	B-4
Aluminum Sheet		50	B-1		40	B-2		20	D-1		30	B-4
Aluminum Castings		40	B-1		30	B-2		20	D-1		30	B-4
Carbon		50	C-1		30	C-1		—	——		—	——
Magnesium		40	B-5		30	B-5		—	——		—	——
Titanium		50	B-5		40	B-5		—	——		—	——

A—Brass plate type adhesion. B—Chlorinated rubber type adhesive. C—Cyclized rubber type adhesive. D—Phenolic resin type adhesive. (Note: Suffix number denotes variation of basic adhesive.)

the engineer a range of flexible materials which will satisfy practically every operational requirement.

Let us first agree that this design engineer will select the metal according to the product operational requirements. Secondly, he will select the rubber which will best answer his requirements based on the general characteristics of the six most common polymers. Finally, based on the combination of materials to be used, the engineer will determine if the indicated adhesion values are sufficient for the application. If so, he will then actually design the part in such a manner that full advantage will be taken of the shape factor of the part and the surface condition of the metal as they affect adhesion values and flex life.

Generally, the product designer specifies only the minimum bond strengths expected with clearly defined descriptions of the test methods. The selection of the particular type of adhesion is left to the discretion of the rubber manufacturer. The notable exception to this policy is found where a product drawing will specify brass plate adhesion, this requirement generally resulting from known satisfactory past results with parts using brass plate adhesion. This is often true for engine mountings and vibration dampers, using natural rubber and steel stampings, where flex life is an important requirement and 100% adhesion testing is not practical.

Types of Rubber Used

The most common rubbers which are used adhered to metal to form functional or decorative molded products are:

(1) *Natural Rubber:* This is a polyisoprene for which the exact chemical structure is not agreed upon. It is characterized by high resilience, high tensile strength, and high abrasion resistance, but is subject to deterioration by oils and sunlight. The major uses of natural rubber are for vibration dampers, engine mountings, and other highly functional parts.

(2) *GR-S:* This is a copolymer of butadiene and styrene in various proportions. It has been the high-production synthetic rubber because of the Government's decision to concentrate on GR-S production prior to World War II. It does not have the best physical properties of the synthetics, but was chosen as the preferred synthetic because of the availability of materials which are used in its production. It is characterized by a medium degree of tensile strength, low oil resistance, poor elongation, poor flex life, and fairly good abrasion properties. A few of the major uses have been in tires, rolls, belts, and diaphragms. A recent development of "cold" GR-S has resulted in an improvement in many of the physical characteristics.

(3) *Neoprene:* This is polychloroprene modified with other ingredients such as styrene. It comes closest in physical properties to natural rubber. It is characterized by high tensile strength, good elongation, moderate resistance to oil and flame, and excellent resistance to sunlight. As a class, neoprenes have rather poor cold resistance, but a few, such as Neoprene FR, have good low-temperature properties. In molded-to-metal products neoprene is used for shaft seals, some outside decorative parts, electric motor mountings where oil is present, and other applications.

(4) *Buna N:* Chemically, this is a copolymer of butadiene and acrylonitrile. It has a high degree of oil resistance, medium physical properties, and good heat and cold resistance. Buna N is used in parts where a high degree of oil resistance is required.

(5) *Butyl Rubber:* Chemically, this is a polyisobutylene, which has the outstanding property of very low permeability to gases. The use of Butyl rubber is well known in tire inner tubes; it is also being used in molded rubber products for diaphragms and valves among other products.

(6) *Silicone Rubbers:* These are organo-silicon-oxide polymers. The most outstanding characteristic of silicone rubbers is their high heat stability and resistance. While natural and synthetic rubbers perform satisfactorily only at temperatures below 250° F., silicone rubber has been used successfully at temperatures from minus 100° to over 500° F. Some of its disadvantages are its high cost compared to the cost of natural and synthetic rubbers, low tear resistance, and low physical properties. One of its wide uses has been for high-temperature gaskets and seals.

Application of Rubber-to-Metal Bonds

The wide variations in the application of adhesion methods to various combinations of the rubber and metal are indicated in Table I. As there are at least five different types of chlorinated rubber type adhesives, several different phenolic type cements, and two different brass plate compositions in use, Table I refers to the different chemical variations in a class by a suffix number (last column of the table).

Problem of Determining Quality Levels

One of the major problems in producing molded rubber products where high adhesions are required is that of knowing the level of adhesion strength that can be maintained without mutilating the part. After a satisfactory method of obtaining adhesion has been developed, it then becomes necessary to establish controls and methods to assure that this adhesion will be maintained on all production pieces. Quality control methods of random sampling are used, but if the adhesion results are unpredictably erratic, even close control methods will not assure 100% satisfactory parts. It is obviously necessary to use the adhesion methods and manufacturing techniques which best lend themselves to producing consistent results as well as the maximum bond strengths. In fact, many times the ultimate in bond strength may be sacrificed and a lower average bond strength accepted if the results prove more uniform and predictable.

The chemical-type or brass plate adhesion has proved more uniform than any of the mechanical-type adhesions when it is applicable to the combination of rubber and metal. When brass plate-type adhesions cannot be used, it becomes necessary to rely upon the most extreme control of adhesive materials in regard to age, viscosity, and temperatures, and also necessary to control carefully the manufacturing operations of metal cleaning, cement applications and drying, and rubber application.

The static bond test, whether by straight tension methods or strip methods, does not necessarily predict the character of the bond when used under dynamic flex applications; therefore, the rubber technologist determining the type of adhesion must consider the application of the part so that the adhesion will be the one that will perform most satisfactorily in actual operation in addition to satisfying static testing or inspection specifications. The bond strengths for any of the methods of obtaining adhesion are usually satisfactory for temperatures in excess of those that can be withstood by the rubber compound. However, in some installations it may be possible for the temperature to exceed normal operating temperature for such a short period of time that the rubber itself will not be appreciably affected, although the metal to which the rubber is adhered momentarily attains the increased temperature. Where such an operating condition is possible, it becomes necessary to provide a bond between the rubber and metal that will withstand the higher temperatures. Here again, the chemical-type brass plate adhesion is better because there is no tendency for the bond to loosen until the temperatures have become high enough to char the rubber.

TABLE II—ADHESION VALUES FOR VARIOUS SURFACE CONDITIONS

Surface Condition	Relative Adhesion Value
(a) Control grit blasted surface	100%
(b) Finely polished surface	147%
(c) Hammered finish	97%
(d) Small longitudinal corrugations	86%
(e) Large longitudinal corrugations	70%
(f) Small transverse corrugations	63%
(g) Large transverse corrugations	59%

Design Features

Surface Condition: In addition to the variation in basic adhesion processes, there also are widely different methods of preparing the metal, depending on the material and the adhesive. Often the adhesion surface is protected after the application of the adhesive, by applying cover coats of rubber or rubber-resin blend cements, where these are necessary to retain the properties of the base adhesive.

The condition of the metal surface has a direct effect on the adhesion values. The different results are shown in Table II as a tabulation of a laboratory test where varying bond strengths are obtained on various types of surfaces on the same steel with the same rubber and

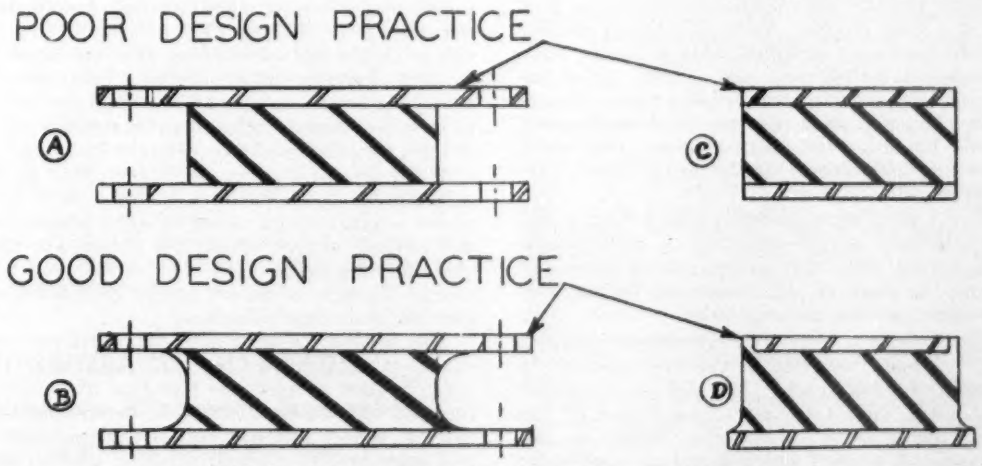


FIG. 7—Edge radius design for rubber-to-metal bonds.

metal preparation. The specimens were subjected to a shear loading. The control grit blasted surface is listed as the 100% value.

These test results show conclusively that the use of corrugations to increase adhesion area does not help the adhesion bond strengths, but actually detracts from them. The best type of adhesion surface is a finely polished continuous surface, but such refinement is generally not necessary. Finishes produced by smooth rolling, drawing, machining, and grinding operations are generally satisfactory, provided that slag inclusions, pits, folds, seams, and burrs are avoided. Smooth cast or gouged surfaces are acceptable also, providing that protruding sprues, flash fins, pits, or porosity, and other surface defects are not present. It is generally necessary to sandblast or pickle adhesion surfaces to remove any rust or scale from the surface before bonding.

Important Considerations

Some of the important product design considerations which must be taken into account in the design of new parts are as follows:

(1) *Factor of Safety:* If the part is a functional part which in operation is loaded in shear or tension, the part must be designed with a factor of safety for the bond. While bond strength of 250 psi can be maintained consistently in the design of mild steel parts, it is desirable to incorporate adequate adhesion area so that under maximum dynamic load the bond is not stressed in excess of 125 psi. This gives a safety factor of 2 to 1 under the worst conditions. Because of space limitations, at times it is not possible to do this, but wherever possible, keeping the bond stress low is good design practice.

Tension mountings are not used very frequently because the characteristics of rubber in tension are not good. A small nick in a rubber fiber tends to progress and cause the whole mounting to fail. When materials other than mild steel are used, the difference in adhesion values between the metal used and steel should be taken into consideration.

(2) *Edge Effects:* Edge effects are very important on shear and compression mountings and, wherever possible, liberal fillets should be used at the edge junction points of the rubber-to-metal bond. Figure 7 shows both poor and good design practice with regard to edge radii. At (A) is shown a mounting which is poorly designed from an edge stress standpoint. At (B) is the same mounting with the edge fillets incorporated as they should be in a good design. View (C) shows another mounting which is poorly designed; (D) shows the same mount redesigned considering edge effects. The advantage of making the mount as at (D) rather than as at (B) is the fact that there is no undercut on the part, and it would be easier and more economical to mold. Strictly from a performance standpoint, however, (B) would be preferred.

It may seem a small matter whether edge radii are used or not, but actually it is quite important on shear mountings. Test results show that mounts which have edge radii may run as much as 50% longer on fatigue tests than a similar mount without edge radii.

Stress Concentration: Stress concentrations indicated in Figure 8 should be avoided wherever possible in product design of rubber parts. The high stress concentration at point 1, view (A), may cause failure of this mount along the adhesion surface even though the adhesion is good. A method which would accomplish the same purpose without objectionable stress concentration is shown in view (B). In many cases where space is very limited, it is sometimes impossible to avoid all stress concentrations but, wherever possible, they should be avoided because they shorten the life of the mounting.

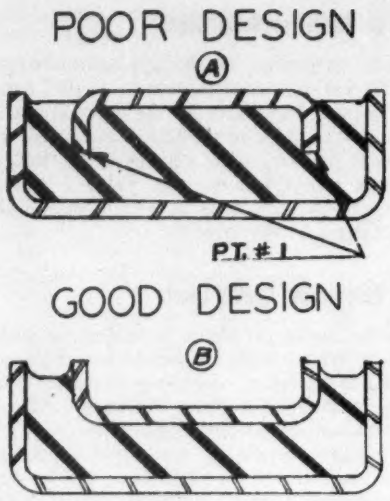


FIG. 8—Rubber-to-metal bond design for stress concentration.

Conclusions

The molded rubber product manufacturers' problems of adhering rubber-to-metal result from the requirements: (1) that several different types of bonding methods must usually be considered in order to select the best for any particular application and, consequently, to have materials and developed manufacturing techniques available for each method; (2) that special-use equipment must be provided, and carefully controlled metal preparation and adhesive application operations must be carried out to an extent far beyond those normally considered, this being necessary to assure uniformity of the bond strength of the finished product; (3) that inspection methods must be used, by means of which either 100% testing or quality control random sampling will indicate level of adhesion quality.

Rubber-to-metal adhesion values of 250 psi can be expected under normal manufacturing conditions. Adhesion values of 500 to 1000 psi can be obtained, but values should not be used as expected bond strengths when designing a rubber product. Laboratory adhesion testing specifications should be established on the basis of strip test method rather than on straight pull test.

Two adhesion methods, referred to as (1) chemical and (2) mechanical, are used by molded goods manufacturers to bond rubber-to-metal. Chemical-type adhesion is obtained by means of brass plating; the metal and mechanical type adhesion is obtained by use of special adhesives in the form of cements used to coat the metal. These cements are mainly chlorinated rubber or phenolic resin base adhesives.

The product designer and the purchaser of bonded rubber-to-metal molded products should allow the rubber manufacturer to select the best type of bond to use for the part. However, it should be determined beforehand that the rubber manufacturer is equipped with facilities and know-how to properly produce, control, and test all types of bonds.

Division of Rubber Chemistry, A. C. S., Meets in Chicago on September 9-11, 1953

THE 64th Meeting of the Division of Rubber Chemistry of the American Chemical Society will be held in Chicago from Wednesday through Friday, September 9 to 11, in conjunction with the 124th National Meeting of the parent society. Headquarters for the Division will be the Hotel Sherman and all major divisional events will be held at that hotel. Herman Boxser, of the Acadia Synthetic Products Division of Western Felt Works, is general chairman of the Local Arrangements Committee, and S. M. Lillis, of the Victor Manufacturing & Gasket Co., is acting as assistant chairman.

The meeting will feature the presentation of 21 technical papers at three separate sessions, starting on Wednesday afternoon, September 9, the papers again having been grouped into classifications as far as possible. Other features of the meeting will include the presentation of the Charles Goodyear Lecture by Dr. John T. Blake, director of research of the Simplex Wire and Cable Co., a luncheon meeting of the 25-Year Club, plant visitations, a business meeting, the suppliers' cooperative cocktail party, and the divisional banquet. A special program for the ladies is also being prepared, including a fashion show at Marshall Field & Co. Another highlite will be a dinner party with a miniature operetta at the famous Kungsholm's Restaurant. Other features are also planned.

The meeting will be opened by Seward G. Byam (DuPont), Division Chairman, who will preside over the first technical session. A. M. Neal (DuPont) will preside over the second session on Thursday morning, and A. E. Laurence (Philblack) over the third on Friday morning. Plant visits scheduled for Thursday afternoon, September 10, already include those to the International Harvester Co., the Chicago Stockyards, and the Museum of Science and Industry. Several other visits are planned, including one or two to rubber plants in the Chicago area.

The Charles Goodyear Lecture will be presented by Dr. Blake during the technical session on Thursday morning, September 10. His subject will be "The Future of Rubber." The Goodyear Medal will be presented to Dr. Blake during the divisional banquet at the Hotel Sherman the same evening, with presentation being made by Mr. Byam. J. C. Walton (Boston Woven Hose), division vice-chairman, will present an address on "John T. Blake, the Man." Dr. H. A. Winkelmann (Dryden Rubber) will act as chairman at the luncheon meeting of the 25-Year Club.

Abstracts of the 21 papers scheduled for presentation, together with their authors and their company connections, follow herewith:

Program of the
DIVISION OF RUBBER CHEMISTRY
AMERICAN CHEMICAL SOCIETY
Hotel Sherman, Chicago, Ill.
September 9-11, 1953

Wednesday Morning—September 9

9:00 A.M.—Registration.
12:00 Noon—25-Year Club Luncheon, Hotel Sherman.

Wednesday Afternoon—September 9

2:00 P.M.—Introductory Remarks by Seward G. Byam (DuPont), Division Chairman.
2:10 P.M.—Technical papers.

Thursday Morning—September 10

9:00 A.M.—Technical Papers.
11:10 A.M.—Business Meeting.
11:20 A.M.—Charles Goodyear Lecture by John T. Blake (Simplex Wire).

Thursday Afternoon—September 10

2:00 P.M.—Plant Visitations.

Thursday Evening—September 10

5:00 P.M.—Suppliers' Cooperative Cocktail Party, Hotel Sherman.
7:00 P.M.—Divisional Banquet, Hotel Sherman.

Friday Morning—September 11

9:00 A.M.—Technical Papers.

ABSTRACTS OF PAPERS

Wednesday Afternoon—September 9

Seward G. Byam, Presiding

2:00 P.M.—1—Introductory Remarks, *Seward G. Byam.*

2:10 P.M.—2—Flame Photometric Determination of Rubber Solids Deposited on Cords and Fabrics. *Harold E. Todd and Henry M. Tramutt (Gates Rubber Co., Denver, Colo.). (Paper will be presented by Mr. Tramutt).*

During the past decade there has been a great transition in the rubber industry from cotton to synthetic fibers, such as rayon, nylon, Dacron and Fiberglas, and also from natural rubber to the many synthetic latices, such as the GR-S types, BAC and Gen-Tac (vinyl pyridine copolymers and terpolymers). With this change, it has become increasingly important to study these component materials in relation to economy, quality, uniformity and product service.

To reinforce rubber products, such as tires, belts, and hose, with these cords and fabrics, it is necessary to have good adhesion of the fibers to the rubber. This adhesion is obtained by pretreatment of cords and fabrics with suitable latex-based formulations. In our research studies we have found that the best way to follow and consistently obtain this adhesion is by the determination of the percentage of latex solids picked up or % SPU. As a result of this program we have drawn up production specifications for controlling solids pick-up on all cords and fabrics that are used in the manufacture of tires and mechanical goods.

Various methods for measuring % SPU, both mechanical and chemical, that are used in the industry were evaluated. The advantages and disadvantages of each of these are discussed. Since these methods were not found entirely suitable for our over-all production and development requirements, a flame photo-

metric method was developed in our laboratory. This method was evaluated on cotton, rayon, nylon, Fiberglas and Dacron using natural rubber, GR-S, and other special type latices. The method is based upon following the sodium contents in the system.

The results of this study show that the described method is applicable for all cords and fabrics and any latex formulation containing sodium. This method has been employed in our production and development work and has been found satisfactory from the standpoint of speed, accuracy, and scope.

2:30 P.M.—3—A Tracer Method for Sulfur Solubility in Rubber. ***I. Auerbach and S. D. Gehman (Goodyear Tire & Rubber Co., Akron, Ohio). (Paper will be presented by Mr. Auerbach).***

Sulfur solubility determinations for rubber have heretofore been limited almost entirely to specimens of reasonable optical clarity as they have depended on the observation of the occurrence of sulfur crystals. A method which can be used readily with opaque compounds is especially desirable for studying the effect of compounding ingredients on sulfur solubility.

A new method has been devised for measuring sulfur solubility which employs the radioactive S-35 isotope. The rubber specimen is prepared in the form of a small disk, .75-inch diameter and about .03-inch thick. This is clamped in a stainless steel cell over a thin layer of sulfur powder which has been tagged with S-35. The rubber is thick enough to absorb all of the beta radiation so that there is no count above background when the cell is brought under a G-M end window counting tube. The cell is closed and placed in a constant temperature oven. Sulfur diffuses into the rubber and reaches an equilibrium concentration corresponding to its solubility at the storage temperature. The attainment of this equilibrium concentration is indicated by a constant counting rate when the cell is removed from the oven at various time intervals, opened, and placed under the G-M tube. The sulfur solubility can be determined from the equilibrium counting rate by means of a suitable calibration curve.

Migration of sulfur to the surface, or blooming, can be followed by changes in the counting rate when a specimen is stored at a lower temperature after the solubility determination. The results for sulfur solubility in GR-S and natural rubber are compared with those secured by other methods and found to be consistent with some of these determinations. The effect of a number of commonly used compounding ingredients, including carbon black, on apparent sulfur solubility was measured and illustrative results are included. The method should be applicable also for measuring the solubility in rubber of compounds tagged with S-35 or C-14.

2:55 P.M.—4—The Effect of Heat Treatment on the Reinforcing Properties of Carbon Black. ***W. D. Schaeffer and W. R. Smith (Research and Development Laboratories, Godfrey L. Cabot, Inc., Boston, Mass.). (Paper will be presented by Dr. Smith).***

The present study was undertaken in an effort to define the relative importance of particle size and surface activity in rubber reinforcement. Previous studies have indicated that heat treatment of carbon black over the temperature range 1000 to 2700°C. progressively decreases surface activity, as judged from heats of adsorption of gaseous absorbates. During this heat treatment, particle size is not significantly altered.

A series of commercial carbon blacks, ranging from fully reinforcing HAF to essentially non-reinforcing FT blacks, was progressively heat-treated in an induction furnace from 1000 to 2700°C. Electron microscope, surface area, and X-ray diffraction data were collected on all samples.

The samples were compounded in a natural rubber tread stock recipe, and complete evaluation of the vulcanizates was carried out. The most striking effect noted was a marked decrease in modulus of the stocks with heat treatment. Although in some instances the modulus of the gum stock was approached, the angle abrasion values were not drastically reduced.

The rubber properties of the finer particle size blacks displayed a more marked response to heat treatment than the coarser blacks.

3:20 P.M.—5—The Adsorption of Iodine and Bromine by Carbon Black. ***J. W. Watson and D. Parkinson (Research Center, Dunlop Rubber Co., Ltd., Birmingham, England). (Paper will be presented by Mr. Parkinson).***

The absorption of iodine by a number of reinforcing carbon blacks is shown to depend upon the solvent, the temperature, and the free iodine concentration. It is found that the surface areas of blacks cannot be directly related to the adsorption of iodine from solution. The relationship between the type of isotherm and the volatile content of the black is discussed.

Desorption of the iodine from a channel black shows that no chemisorption takes place, adsorption hysteresis being due to what is here termed "activated physical adsorption".

More pronounced hysteresis is obtained when bromine is used in place of iodine. Part of this hysteresis is caused by a substitution reaction (hydrobromic acid being liberated) and the remainder appears to be an addition reaction.

The bromination of a reinforcing black is found to have no effect on its reinforcing properties. It is concluded, on the assumption that the brominated black is saturated, that unsaturation in carbon blacks is not a factor in rubber reinforcement.

3:45 P.M.—6—Extrusion Factors of Black Rubber Compounds. ***Isaac Drogin, Hester R. Bishop, and Paul Wiseman (United Carbon Co., Charleston, West Va.). (Paper will be presented by Dr. Drogin).***

Extrusion requirements are dictated by the nature of the compound and the size and shape of the desired extrusion. In extruded goods, such as treads, tubes, weatherstripping, etc., uniformity of extrusion is of paramount importance. The stock must run uniformly in the existing dies and always remain true to gauge. Other requirements stressed are high extrusion speed in order to achieve maximum volume of production, constant weight per unit length, stock distribution, regular shrinkage (or swell), smoothness (some roughness is permissible in the case of treads), and non-porosity.

The requirements for extruded industrial mechanical rubber goods having a wide range of Shore hardness are even more critical. They call for the compounds to extrude the same way all the time, especially through the intricate shaped dies of restricted area. The extruded sections must retain their shape, be of consistent gauge, and adhere to the proper dimensions and to the limits of tolerance. They should expand uniformly from the die and be characterized by dimensional stability, sufficient raw rigidity, smooth surface and edges, uniform plasticity, reduced inherent nerve, and possess the same scorch rate.

Extrusion properties are governed by the type rubber used, its degree of breakdown, the amount and the type of physical or chemical softeners incorporated in the compound, the quantity and type of pigment loading, and the uniformity of dispersion, mixing temperature, mixing cycle, remilling, compound Mooney viscosity (or plasticity), scorch rate, condition and the form of the material supplied to the extruder, aging of stocks before extrusion, temperature of the stock delivered to the extruder and extruded from the die, type and style of die and head used, and the temperature conditions in the extruder.

Carbon blacks are characterized by different extrusion properties, and some differences may even exist in carbon blacks of the same type. The extrusion properties of SAF, HAF, EPC, FEF (MAF), FF, HMF, GPF, SRF, and MT types of carbon blacks in various rubbers are shown here. Included are the effects of varying amounts of peptizer and softeners; carbon black loadings ranging from 45 to 55 parts per 100 of RHC in a tread type compound, and higher loadings in industrial mechanical rubber goods; blends of carbon black; shorter mixing cycles; remilling; mixing at high temperature; extruding at different temperatures and various speeds, and "backing" the die. The effects of these measures on processing, extrusion, and reinforcement are noted.

4:15 P.M.—7—Experimental Blacks for Rubber Compounds. ***A. G. Cobbe, M. Polley, and J. S. Boyd (Cabot Carbon Co., Pampa, Texas). (Paper will be presented by Mr. Cobbe).***

A series of experimental oil furnace blacks were prepared and tested in natural and synthetic rubbers. The particle size, as

determined by electron microscope and nitrogen surface area determinations, characterized these blacks as being finer than presently available commercial furnace blacks. The reinforcing ability of these blacks did not increase to the extent expected on the basis of the particle size measurements. The paper will discuss the possibility that current techniques of dispersion do not utilize fully the surface area available with these blacks.

4:35 P.M.—8—The Effect of Various Surface Treatments on the Reinforcement and Rate of Cure of Silica-Loaded Stocks. ***Walter R. Hausch (Chemical and Physical Research Laboratories, Firestone Tire & Rubber Co., Akron, Ohio).***

The work of Thies showed that the dye adsorption of various clays was a good indication of the reinforcement to be expected from them in rubber stocks. In the course of this work it was found that the colloidal silicas have even higher dye adsorption. This is reflected in high accelerator adsorption and consequently starved cures.

It was found that dye adsorption could be reduced and reinforcement increased by heating the silica at elevated temperatures. Optimum temperatures for reinforcement were from 600 to 800°F. The dye adsorption and the tensile properties of a silica-loaded stock were used in the determination of this optimum. These results correlated very well with published data for the surface area and heat of wetting of heated silicas.

Various glycols added to colloidal silica also reduced accelerator adsorption and gave tighter cures. Dipropylene glycol imparted greater reinforcement to the silica-loaded stocks than any of the glycols tested. Heptanediol-2,4 improved reinforcement to almost the same extent. The improvement may be due to the molecular structure of these compounds.

The combined effects of heat treatment and glycol or amine addition resulted in greater reinforcement at shorter curing times and with lower accelerator requirements.

Thursday Morning—September 10

A. E. Neal, Presiding

9:00 A.M.—9—Vulcanization Characteristics of a Series of 4-Methyl-5-Substituted 2-Thiazolethiols and Their Derivatives. ***J. J. D'Amico, K. E. Creed, Jr., M. W. Harman, and R. O. Zerbe (Research Department, Monsanto Chemical Co., Nitro, West Va.). (Paper will be presented by Mr. D'Amico).***

The trend toward the more scorchy furnace blacks has brought about increased scorch problems for which the conventional accelerators appear to offer only a partial solution. The economic considerations have limited the search for more delayed action products, in the past, to the relatively cheap 2-mercaptobenzothiazole derivatives. Today, however, the ever rising cost of aromatics make the evaluation of aliphatic type materials, such as the 4-methyl-5-substituted 2-thiazolethiols, potentially more attractive.

An extensive study has been made on this series of compounds and their derivatives with the view of obtaining stable materials which would provide the desired delayed action properties. Of these, the thiazolesulfenamides prepared by the oxidative condensation of 5-carbethoxy-4-methyl-2-thiazolethiol with morpholine and certain primary amines gave more delayed action than commercial accelerators with equal or better physical, aging, flexing, and heat build-up characteristics.

Data demonstrating the above-mentioned physical properties are given for a series of 5-carboalkoxy-4-methyl-2-thiazolesulfenamides in Hevea and GR-S tread stocks. The synthesis of a number of these new compounds is described along with the other derivatives.

9:20 A.M.—10—Compounding with Lignin and Humic Acid. ***F. J. Tibenham (Dunlop Rubber Co., Ltd., Birmingham, England) and N. S. Grace (Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., Canada). (Paper will be presented by Mr. Tibenham).***

A considerable amount of work has been carried out on the compounding of rubber with lignin in both the United States and United Kingdom in view of its potential abundance and low cost and its promise as a high performance compounding ingredient. The hitherto anticipated good results have not been consistently achieved and reasons for this are discussed.

Methods employed to improve lignin-rubber compounds are described, involving modifications to the lignin itself, to the curing system and to processing techniques. The use of lignin in combination with furnace black is also examined.

Like lignin, humic acid is also available from a cheap natural source and has potentially interesting properties as a compounding ingredient. The parallelism between the behavior of humic acid and lignin is discussed in the light of the similarity of their constitutions.

9:40 A.M.—11—Mechanism of Vulcanization of Polysulfide Rubber. ***E. M. Fettes, J. R. Panek, and J. S. Jorczak (Thiokol Chemical Corp., Trenton, N. J.). (Paper will be presented by Mr. Fettes).***

Although polysulfide elastomers such as Thiokol Type FA have been vulcanized for years by empirical methods, the mechanism has been unknown. A clear understanding of the vulcanization process can only be attained by a knowledge of the chemical reactions taking place in the cure.

The experimental study deals specifically with the class of polysulfide polymers such as Thiokol Type FA which are heat cured with zinc oxide. The usual compound contains also benzothiazyl disulfide and diphenylguanidine. The effect of omission of any and all of these materials is studied as well as the effect of amount of zinc oxide and replacement by other zinc salts and metallic oxides.

This investigation has shown that the chain ends are not thiol groups but probably hydroxyl groups caused by very slight alkaline hydrolysis of the halide groups of the monomer in the polymerization. It has also been shown that zinc oxide both removes the effect of the peptizing agent and causes coupling of chain ends.

10:05 A.M.—12—A New, Unvulcanized Composition of Resin and Rubber Having Unusual Toughness. ***H. S. Sell and R. J. McCutcheon (Goodyear Tire & Rubber Co., Akron, Ohio). (Paper will be presented by Mr. McCutcheon).***

The rubber and plastics industries are showing increasing interest in thermoplastic compounding materials having high impact strength, high softening temperatures, and a range of flexibility and rigidity. Efforts have been made to achieve these qualities through blends of resins and elastomers. Cured blends, requiring curing cycles and disposition of cured scrap, have obvious disadvantages, and uncured blends having all the desired properties are few indeed. To date, only one blend, that of styrene-acrylonitrile resin and nitrile rubber, is of commercial importance.

Recently, another blend of a resin and an elastomer has been developed which requires no cure, and which has several outstanding properties. This blend combines a new type of styrene resin (Pliotuf XG85C) and a chloroprene rubber. Blended in proportions ranging from 90 of resin and 10 of neoprene to as low as 40 of resin and 60 of neoprene, a family of stocks is obtained which show a range in stiffness from that approaching polystyrene to one approaching polyethylene. In addition, they show outstanding toughness, high heat distortion, and are highly resistant to impact at temperatures as low as —20°F.

Conventional curing techniques used in neoprene detract from the desirable properties of the blend, indicating that the preferred way of using these blends is uncured. Such blends may be prepared and processed on conventional rubber or plastic equipment, or they may be prepared by blending latices.

10:30 A.M.—13—Comparison of Methods of Accelerated Aging of Latex Foam Rubber. ***T. H. Rogers and H. H. Heineman (Goodyear Tire & Rubber Co., Akron, Ohio). (Paper will be presented by Mr. Rogers).***

Samples of foam rubber made in the laboratory and others obtained from commercial sources are evaluated using the conventional accelerated aging methods. The oxygen absorption technique and a Compression Change/Oven (212°F.) Aging graph method are used for comparison.

These latter methods show some degree of correlation whereas the conventional methods show little correlation. A similarity exists between normal room temperature aging of foam rubber as measured by compression change and accelerated aging as measured by the Compression Change/Oven (212°F.) Aging method.

This latter method shows the degree of after-vulcanization. Latex foam rubber containing synthetic has better long-term aging properties than that consisting of 100% natural rubber.

10:50 A.M.—14—Load-Carrying Capacity of Latex Foam Rubber. ***Joseph A. Talalay (Sponge Rubber Products Co., Shelton, Conn.).***

Specifications for foam rubber usually include a required hardness, which is measured by the force necessary to compress the material to 75% (in the United States) or 60% (in Great Britain) of its original height. The hardness of a slab of foam rubber depends upon the type of latex and compounding materials, upon the cell size and structure, and primarily upon the foam density.

For slab material of any given composition and structure, the hardness can be related to density by a simple equation. For cored material, hardness and density can be related by integrating deflections of small increments of height over the entire height of the article. This procedure can be reduced to a few simple equations for most shapes of core pins.

Using these equations, the effect of mold configuration on weight has been investigated, and it has been found that for any specified hardness the required weight of a foam rubber article can be reduced by: (1) Increasing core pin diameter, (2) Decreasing pin spacing, and (3) Decreasing the thickness of the top sheet.

Use of certain synthetic rubber latices (cold GR-S), or a mixture of synthetic and natural latices, will also result in a lighter article meeting the prescribed hardness specifications.

11:10 A.M.—Business Meeting.

11:20 A.M.—Charles Goodyear Lecture: The Future of Rubber. ***John T. Blake (Simplex Wire & Cable Co., Cambridge, Mass.).***

Friday Morning—September 11

A. E. Laurence, Presiding

9:00 A.M.—15—High Polymer Training and Research at the University of Michigan. ***Lindsey M. Hobbs (University of Michigan, Ann Arbor, Mich.).***

At the University of Michigan high polymer courses are available to seniors and graduate students which emphasize the physical, chemical, biological and engineering aspects of the subject. Courses in the Department of Chemical Engineering have been intensified and extended to combine the study of the fundamental features of polymerization, molecular structure and intermolecular attractive forces with appraisal of fabrication methods and the properties of high polymers as engineering materials. Students with basic interests in various branches of chemistry, physics or engineering can select a phase of high polymer study as an area for specialization for advanced degrees.

Funds for fellowships and equipment for fundamental research on rubber have been provided by a grant from the Goodyear Tire and Rubber Company to the Michigan Memorial-Phoenix Project. Several assistantships and fellowships have been established. The emphasis of this research is being placed on the molecular and structural features which influence the internal friction of rubber, and attention is devoted to the effects of polymerization variables and fabrication methods on final properties.

9:20 A.M.—16—Mercaptans (or Thiols) in Polymerizations: A Review with Recent Developments. ***Arthur H. Krause (Kentucky Synthetic Rubber Corp., Louisville, Ky.).***

Description of properties and general reactions of mercaptans. They react with olefins under suitable conditions, forming normal addition products and in the presence of peroxides abnormal addition products. Value of mercaptans in polymerization reactions as promoters, but their main function is as regulators or modifiers. They improve very much the processability and solubility of the resulting polymers. Mercaptans act through free radical mechanism as chain transfer agents. They terminate the growth of one polymer chain with their end hydrogen and start another chain with the mercaptyl radical.

Behavior of primary and tertiary mercaptans in butadiene-styrene copolymerizations at 50°C. and 5°C. (hot and cold rubber). Importance of the concentration of mercaptans at the locus of reaction. Disappearance rates of mercaptans vary with type, agitation, pH, fatty acid or rosin soaps. Primary mercaptans disappear faster than tertiary mercaptans. Tertiary dodecyl mercaptan disappears at a faster rate than tertiary tetradecyl and hexadecyl mercaptan. Determination of residual mercaptan. Stepwise addition of mercaptans to control the molecular weight for a more uniform product over a wider conversion range. Side reactions of mercaptans. Other polymerizations with mercaptans. Patent literature of polymerizations with mercaptans. About 30 references.

9:45 A.M.—17—Molecular Weights of Emulsion Polydienes. ***Maurice Morton (Government Laboratories, University of Akron, Akron, Ohio).***

In the polymerization of dienes, the cross-linking reaction can be expected to have a marked influence on the molecular weight distribution, leading finally to the formation of insoluble polymer networks. Such a reaction should have a relatively small effect on the number-average molecular weight, but a large effect on the weight-average molecular weight.

Studies of the emulsion polymerization of butadiene, isoprene and chloroprene have confirmed the above hypothesis. The number-average molecular weights have been found to agree fairly well with those predicted from the kinetics of the system, and were found to depend largely on the initiator and/or modifier used. However, the viscosity-average molecular weights have been found to be dependent largely on the extent of the cross-linking reaction. Thus, isoprene has been found to have a much smaller cross-linking rate during polymerization than butadiene, while chloroprene shows a higher rate.

These differences in cross-linking rate are reflected in the M_v/M_n ratio found for the above three polymers. Thus, instead of the theoretical value of 2-3 to be expected in the absence of cross-linking, the actual values rise to 5-10, depending on the monomer used and the polymerization temperature. The onset of gelation, as expected, is governed by both factors, i.e., the molecular weight and the cross-linking rate, and is therefore a function of the initiator-modifier system, the polymerization temperature and the particular diene.

10:05 A.M.—18—Sodium Formaldehyde Sulfoxylate as Reducing Agent in Low Temperature GR-S Polymerization. ***R. W. Brown, C. V. Bawn, E. B. Hansen, and L. H. Howland (Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn.). (Paper will be presented by Mr. Brown).***

A new recipe for polymerizing GR-S at low temperatures, composed of an organic hydroperoxide, sodium formaldehyde sulfoxylate, and an iron salt complexed with the tetrasodium salt of ethylene diamine tetra-acetic acid, has been developed. With disproportionated rosin soap as emulsifier and diisopropyl benzene hydroperoxide as oxidant, reaction times of 2 to 13 hours to 60% conversion at 5°C. were obtained by varying $FeSO_4 \cdot 7H_2O$ from 0.060 to 0.005 part per hundred parts of monomers. Low peroxide and sulfoxylate levels gave good rates of polymerization, indicating appreciable savings in commercial production. Activator make-up was simplified compared to that for the ferro-pyrophosphate recipes used in most of the present low temperature GR-S production. This results in improved uniformity in polymerization rates and in the final polymer. Pilot plant and preliminary plant scale trials have substantiated laboratory data.

In high solids latex recipes the new activator system showed promise of giving more fluid and lighter colored latices, which should improve the appearance of products fabricated from the latex, and also extend the use of low temperature latex to some fields where it is not now usable due to discoloration. Reaction rates were adjusted to almost any desired level by varying the amount of complexed iron.

10:30 A.M.—19—Non-Discoloring Stabilizers for GR-S. *B. A. Hunter, R. R. Barnhart, and R. L. Provost (Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn.). (Paper will be presented by Mr. Hunter).*

Natural Hevea rubber is stabilized against oxidative deterioration by the presence of naturally-occurring antioxidants. Likewise, unvulcanized synthetic rubber polymer of the butadiene-styrene class (GR-S) requires the presence of stabilizers for protection against environmental deterioration factors. GR-S is very susceptible to heat deterioration during manufacture of the polymer and particularly during hot processing when being fabricated into rubber products unless an effective stabilizer is present. The benefits of the stabilizer appear as positive protection against heat resinification during manufacture and storage and especially as protection against the deterioration of the ultimate properties of the vulcanizate which results from heat degradation of the polymer during hot milling and processing.

Several conventional rubber antioxidants are effective stabilizers but are badly discoloring. Non-discoloring stabilizers have been introduced which vary widely in their effectiveness. Data are presented comparing the effects of a number of GR-S stabilizers that have seen commercial use in the United States. Particular attention has been given to non-discoloring types. Advantages of the alkylated aryl phosphite class of stabilizers are seen in resinification data, control of gel build-up and prevention of wide Mooney viscosity variations during heating or hot processing, and are particularly evident in the retention of the physical properties in vulcanizates from polymers subjected to processing heat.

10:55 A.M.—20—Solution Coatings of Chlorosulfonated Polyethylene. *R. H. Sudekum (Polychemicals Department, E. I. du Pont de Nemours & Co., Wilmington, Del.).*

Chlorosulfonated polyethylene has been found to have outstanding resistance to ozone and many chemicals and to have good colorability and weather resistance. These properties combined with good adhesion to a variety of materials make it an excellent polymer for flexible, protective and decorative coatings. Rubber articles that crack because of ozone and sunlight can be protected with coatings which are resistant to abrasion and have good elongation. The staining materials in most black rubber vulcanizates can be prevented from discoloring the coatings by the incorporation of aluminum powder and large amounts of colorants in the solution. These solution coatings can be prepared by standard techniques. Since the chlorosulfonated polyethylene has good solubility in aromatic hydrocarbons, solutions containing up to 25% solids can be used. A higher solids content can be obtained from a dispersion in a non-solvent medium.

The coatings can be applied by brushing, spraying, or spreading. They have been used to coat rubber, fabrics, metals and masonry. Sponge rubber door and window seals and reclaim automotive floor mats have been successfully protected and decorated.

Uncured chlorosulfonated polyethylene has sufficent strength to be used for clear lacquers. Since these lacquers have very high elongations and retain their ozone resistance, they are being tested for coatings of balloons, boots and toys.

11:20 A.M.—21—Blends of Chlorosulfonated Polyethylene with Butadiene-Acrylonitrile Copolymers. *F. F. Holub, R. A. Hutchinson, and W. J. Remington (Polychemicals Department, E. I. du Pont de Nemours & Co., Wilmington, Del.). (Paper will be presented by Mr. Holub).*

Chlorosulfonated polyethylene when properly vulcanized possesses many outstanding properties including unusual durability on exposure to ozone, oxygen, heat and weather. Vulcanized butadiene-acrylonitrile copolymers on the other hand have achieved wide recognition because of their outstanding oil resistance. It has been shown that these elastomers are mutually compatible, and by varying their concentration in blends, varying degrees of ozone and oil resistance can be obtained. In addition, by suitable blending, good low temperature properties and heat, abrasion, and flex resistance may be obtained. Blends containing more than 25% chlorosulfonated polyethylene possess a useful degree of ozone resistance and are of particular interest. Oil resistance is largely a function of the acrylonitrile content in the total elastomer and improves with increasing nitrile concentration.

The curing system for these blends requires new compounding systems because of the differences in the chemical structure of the individual elastomers. The best vulcanizates are obtained when litharge is employed as the curing agent for the chlorosulfonated polyethylene and as the accelerator-activator for the acrylonitrile rubber. It is possible to bring out the best characteristics of both elastomers by variations in the concentration of sulfur, accelerator, and filler.

11:40 A.M.—22—Adhesives for Chlorosulfonated Polyethylene. *G. H. Bowers, I. D. Roche, and R. C. Baker (Polychemicals Department, E. I. du Pont de Nemours & Co., Wilmington, Del.). (Paper will be presented by Mr. Bowers).*

The combination of colorability and durability found in chlorosulfonated polyethylene is unique in the elastomeric field. In order to take advantage of these properties it is often necessary to bond this elastomer to itself and to other materials. This paper discusses the characteristics of some of these bonds.

Chlorosulfonated polyethylene compositions have been bonded to various metals using both commercial and newly-developed adhesives. These bonds are capable of withstanding prolonged immersion in hot water.

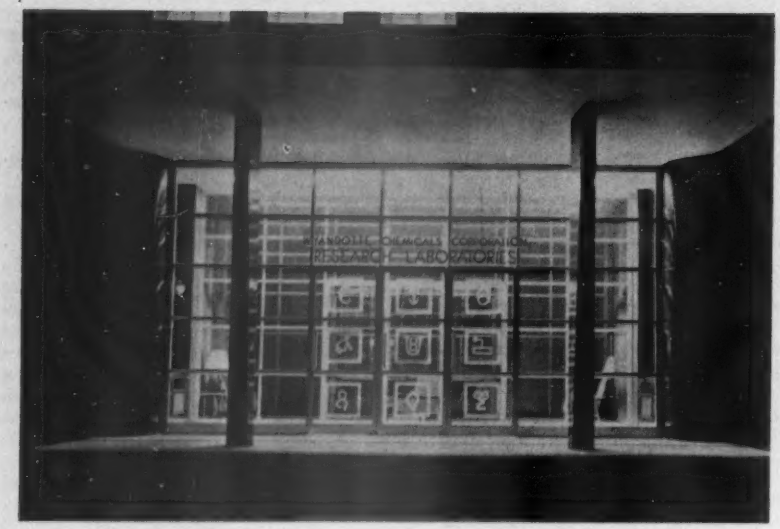
In some formulations, chlorosulfonated polyethylene, like other hydrocarbons containing chlorine, can liberate HCl and cause the degradation of the fabric with which it is in contact. This fabric tendering is prevented by the use of MgO in the adhesive curing system. Chlorosulfonated polyethylene can be bonded to Dacron (polyester fiber), Orlon (acrylic fiber), and nylon, using an adhesive based on the polymer itself.

An adhesive based on chlorosulfonated polyethylene will bond this elastomer to itself and to the common elastomers with good strength. Both room and elevated temperature strengths of these bonds are good. Using a room temperature cure, vulcanized chlorosulfonated polyethylene can be bonded to itself with a strength equal to the tear strength of the vulcanizate.

A new **indicating controller** featuring anticipating action has been added to the Wheelco Model 200 Series Capacitrol line featured by the Wheelco Instruments Division, Barber-Colman Co., Rockford, Ill. The new Capacitrol, Model 221-C, has the anticipating action of the Capaciline added to the "electronic link" to give unvarying "straight line" control.

Ball and Jewell, Inc., 22 Franklin St., Brooklyn 22, N. Y., has announced that its **Laboratory 251 Granulator** has been redesigned and improved, incorporating many new features recommended by leading molders. The redesigned unit granulates directly into any 30-inch drum, entirely eliminating the necessity of transferring ground material from bin to drum. However, for those who prefer it, the unit can also be provided with a bin receptacle.

Designed for accurate measurement of variables susceptible to rapid changes occurring in many present-day laboratory and test applications, a new **Electronik single-record strip chart recorder** has been recently introduced by the Minneapolis-Honeywell Regulator Co., Philadelphia 44, Penna., with a pen speed which will traverse the full 11-inch width of the chart in only one-half second. The measuring system itself is essentially the same as that of the conventional Brown Electronik potentiometers.

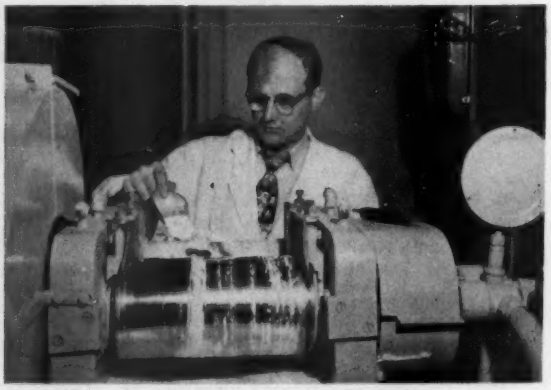


Shown here is the striking entrance to the new Research Center recently opened by the Wyandotte Chemicals Corp., of which the Rubber Laboratories are an integral part. The symbols on the entrance depict the ancient signs of the alchemist. The top row symbols express the three basic raw materials, limestone, coal and salt, while the bottom row depicts the processes used in the preparation of Wyandotte products: distillation, calcination and precipitation.

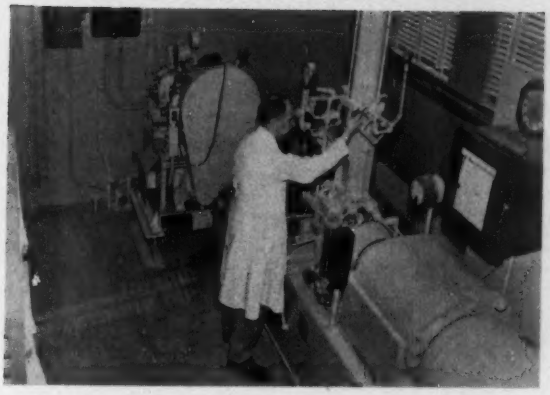
New Rubber Laboratories at the Wyandotte Research Center

THE new Research Center recently opened by the Wyandotte Chemicals Corporation at Wyandotte, Mich., permits a consolidation of the firm's many research and development activities. It also permits the company to materially expand not only its long-range research within the organic and inorganic chemical fields, but special research projects assumed by the concern on behalf of the national defense program. The research laboratories of the Center are said to embody a new concept of industrial laboratory design and construction. The new Research Center covers about one city block and includes pilot plant facilities. Adequate provision has been made for future expansion. An integral part of the new Research Center is the Rubber Laboratories which are completely equipped for the testing and evaluation of rubber and plastics compounds. The accompanying photographs depict only a few of the facilities which the Rubber Laboratories of the new Wyandotte Research Center offer and some of the operations conducted there.

The four-speed laboratory model Banbury mixer shown above requires a 25 hp motor for mixing a two-pound batch. The operator shown here is controlling the hydraulic ram which holds the viscous mass in the mixing chamber.

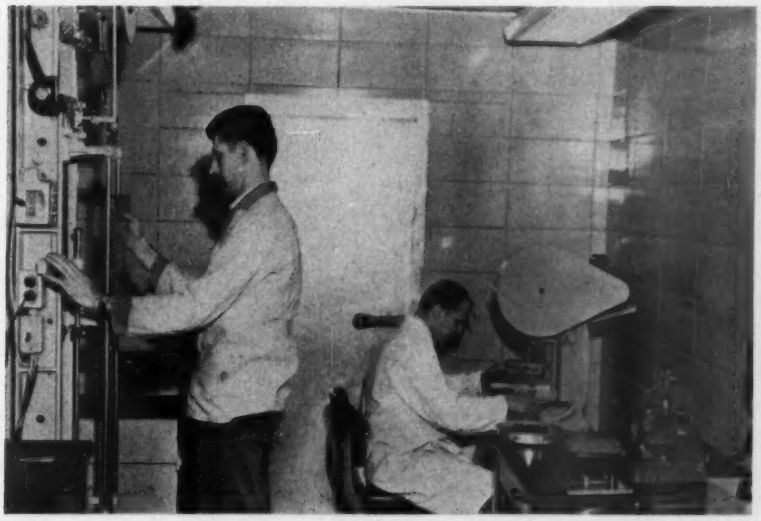


The operator above is shown incorporating a rubber-reinforcing grade of calcium carbonate into a rubber mix. Mixing is accomplished by the shearing action of the differential speed rolls of the 6 by 12-inch mixer.



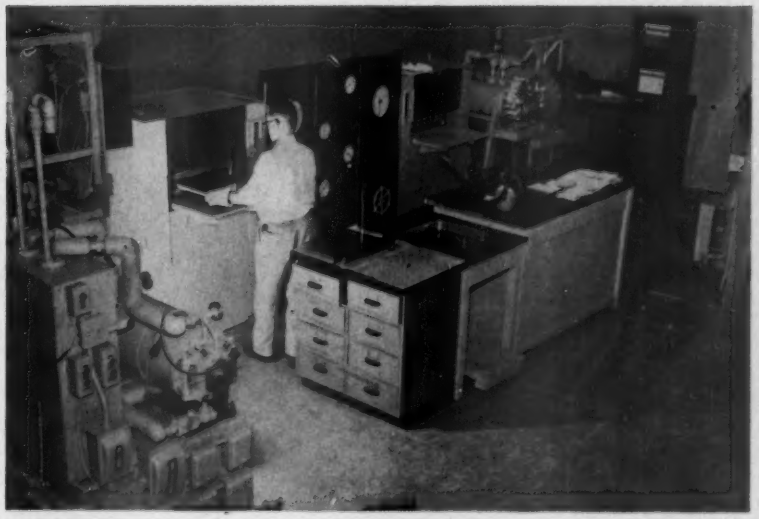
The Rubber Laboratories of the new Wyandotte Research Center are equipped to evaluate experimental products from the company's various research groups and to develop new rubber formulations. In the photograph above, an operator is using a Banbury mixer to prepare a new rubber formulation for test purposes.

In the photograph above, an operator is shown removing a standard test specimen from a mold. The specimen has been cured at 307° F. under a pressure of 1,000 pounds per square inch. The control board in the foreground shows the temperature recorder and semi-automatic hydraulic system and time controls used in operating the presses.



The photograph to the left shows the automatically conditioned room which is maintained at standard temperature and humidity for rubber test work. On the right, the operator is using the sample cutter for preparing rubber test specimens. In the right foreground are instruments for gaging specimen thickness and determining hardness. The operator on the left is determining tensile and elongation properties of rubber specimens on the Scott tester.

Shown to the right is a view of the Rubber Laboratories which are well equipped with two-roll rubber mills, a Banbury mixer, curing presses and several items of vulcanizing equipment, as well as a rubber extruder for extrusion tests and wire insulation studies. The photograph shows a staff member using one of the curing presses to prepare samples for physical testing.



Maintenance of Rubber Machinery

A Panel Discussion Held at the May 12, 1953, Meeting of the Los Angeles Rubber Group

THE May 12th meeting of the Los Angeles Rubber Group held at the Hotel Statler in Los Angeles, Calif., featured a panel discussion on "Maintenance of Rubber Machinery." J. Arensmeyer (Golden West Products) acted as moderator and panel members included T. Cook (Goodrich), E. Davenport (Firestone), R. Holman (Voit Rubber), L. Kotich (Ohio Rubber), V. Neschke (Kirkhill Rubber), and M. Uhrich (Goodyear). The questions asked of the panel, and the answers given, appear below:

Question—On large bull gears, is it better to use a drip pan and light grease, or a tacky grease?

Answered by Mr. Davenport: On this question I feel that it could be argued both pro and con as to whether you would use a drip pan and a light grease. I think under abnormal conditions, such as a dirty or dusty condition, excessive loads or excessive speeds, I'd go for the drip pan and a light grease. We have been using this method on our Banburys for several years and have had good results.

In answer to the tacky grease, under normal conditions I feel that a tacky grease is OK. A good tacky asphalt-base grease, properly used, at the right time, will give good service. We have been using this type of grease for the last twenty-five years, and, believe it or not, we haven't lost a gear yet, so I don't think there is any set rule that you can go by. A lot depends on the conditions under which these gears are operating.

Question—What types of ram packings are recommended for least maintenance of hydraulic presses?

Answered by Mr. Holman: I believe the Standard U Packing made of molded neoprene, possibly reinforced at the heel with fabric, is probably the simplest, least expensive, and the most effective in the majority of cases. Obviously, the condition of the ram and the back-up ring is in many instances more important than the condition of the packing because it retains the packing, but there are a lot of other packings which can be used on the rings. Some special all-fabric impregnated U packing can be used, but I believe the simplest one with the neoprene is sufficient in most instances.

Question—What is the best method to check leakage in steam tapes?

Answered by Mr. Kotich: Well, I assume that what is required here is a good positive method for checking trap leakage, and for that I would recommend a "T" or a "Y" on the downstream side of the trap with a test valve installed in the "T" or "Y". To make this really work, you'd also have to install a valve in your return header so you can shut that off from the main header and open your tester and get a good positive collection on the trap itself. Theoretically, you should be able to tell if you're getting leakage just from the temperature of the return line on the downstream side of your trap. Of course, there are a lot of "ifs" and variables in that, and I've yet to be satisfied with that method. I don't think it will work in the average shop—trying to determine leakage by temperature methods. This method of installing a test valve is the best as far as I can tell. Of course, for good trapping, you want to install a strainer ahead of your trap. I think that is where a lot of your traps run into difficulties. People install them without any strainers ahead of the traps, and as a result they get all kinds of corrosion and rust into it, and pretty soon you have leakage. So for the best practice, I would recommend a strainer, trap, test valve, and a valve to shut off the header.

Question—Do you have a routine set-up on checking traps periodically?

Answered by Mr. Kotich: Yes, we do collect them periodically, and we find in spite of strainers and everything else there is a lot of dirt and corrosion in the traps that we have to clean out.

Question—Is it satisfactory to return condensate to the boiler from vulcanizers where the steam has been in contact with the curing rubber?

Answered by Mr. Holman: I would say no. I know almost no instance where the condensate salvaged from a vulcanizer is returned to the boiler with success. It's usually contaminated or comes in contact with the products in the autoclave or with oils or lubricants or trucks and sidings. It has been in contact with rust and with air. I believe the amount of condensate salvaged is so small it isn't worth while contaminating the boiler feed water with it.

Answered by Mr. Neschke: I've had first hand experience with what can go wrong by having a condition like that. We were having boiler trouble and searched all over for the trouble until we traced the thing down to the problem mentioned here, and it was the contamination in the steam condensate returned from the vulcanizer that had affected the boiler tubes to the point where we had to re-tube the boiler for that reason, and after that was corrected, we corrected the problem completely. It does definitely have a very serious effect.

Question—Is molybdenum disulfide (MoS_2) in greases and oils for lubricating mills and calenders, gear boxes, etc., recommended over lubricants without such additives?

Answered by Mr. Uhrich: Not being familiar with the product, I attempted to secure some information about it and so I called our regular lubricant vendors. Therefore, what I tell about this subject is going to be based on what I found out.

To go back to the wording of the question: where the term "additive" is used, everybody agreed that this was a very valuable—I won't say ingredient—a very valuable element in lubrication. One fellow said it would just be another filler and another said, "If you mean by additive that you add it to the oil with the idea of enhancing the properties of that particular oil, it wouldn't be worth a nickel." Its principal purpose and advantage seems to be in places that are remote and inaccessible and that never get any lubrication and in high temperatures and slow moving loads, such as drawing wire or drawing sheet metal. In such applications, it has been decidedly successful.

All of the people I talked with admit the molybdenum disulfide has a very definite place in lubricants and lubricants containing it can be used in much of the same places where flake graphite is used. For such purposes, the material can be used as an additive to the general line of lubricants, such as light oils, medium oils, and the like. None of these people, however, were especially enthusiastic about its use for such purposes. We have had no experience of our own in this instance.

Question—What changes are necessary and what special maintenance problems are involved on an extrusion machine to make it suitable to run vinyl or rubber interchangeably?

Answered by Mr. Neschke: It would be possible to use the same machine to extrude vinyls and extrude rubber but it isn't very practical. Several things are involved in it. The difference primarily is the type of screw and the length of the screw. The length of the barrel on these things that take in vinyl is commonly filled with a granular form and fed directly over the top of the screw and extruded out in that manner. It's taken in cold and has to be brought up to temperatures up to and including 400°F. In rubber tubers we are more interested in cooling them than heating them, so consequently a problem is involved there. By being able to heat your barrel to a proper temperature that you could probably get in most plants of our type, we would be able to get the barrel to 300°F., but we'd have a very short barrel and the extrusion would be a questionable quality on what we could do with it. One company has a way of handling that situation. They take the normal tube, head it off, make a barrel extension, and put in a special worm, and have made a plastic extruder out of the extruder machine. In general, it is felt you should either have a plastic machine or a rubber machine. It is possible to warm the vinyl up on a mill and feed it in at a warmed-up temperature rather than feeding it cold, and that would help the situation to some extent, but I think there again we have two separate fields, and I believe they are only slightly related.

Question—Would you say that it would be more practical to have a plastic tuber and convert it for use for rubber merely by adding additional cooling?

Answered by Mr. Neschke: I guess you could. On some of these they don't even cool the plastic machine, and don't make it so you can cool it. We aren't worried about heating—we are worried about cooling on our rubber tubers, so I don't think that would work out either.

Question—What relationship should maintenance cost have to total sales?

Answered by Mr. Uhrich: That should be down to zero for the sake of sales and profit. Actually, in our company, we do not tie in with sales. We use a conversion cost only, which is our manufacturing operation and which does not include the cost of materials, that is, the ingredients of the product, and I don't mind telling you what ours is. Of that conversion cost, our manufacturing equipment runs about 6½% and buildings and general maintenance runs 2½%, or a total of about 9%. If you add to that the cost of ingredients and our sales costs, including such things as advertising, it would get down to rather a small percentage. But we do not deal in sales dollars at our place.

Answered by Mr. Cook: We don't use the sales dollar either. I wonder if most companies still don't use the pound cost.

Answered by Mr. Davenport: We use the pound cost all together.

Question—What would it be per pound, for example?

Answered by Mr. Cook: That would vary between rubber companies. An industrial products plant in small parts, for instance, with a lot of finishing operations, would be higher than a tire plant.

Answered by Mr. Davenport: It's always too much regardless of how low you get it.

Question—What is the best recommended practice to maintain and prevent dust leakage through Banbury dust rings? Should light or heavy oil be used, and how often should they be inspected?

Answered by Mr. Cook: Well, there are three or four answers to that question. Number 1 and number 2 would probably be the proper spring tension on the dust stops, and the proper alignment of the stops so that they can move back and forth freely and yet be in contact with the end of the rotor. Number 3 would probably be proper lubrication, and I would think that is probably most important. As far as the oil is concerned, we use Maropa No. 3. That's a Texaco product which is about the same viscosity as a 40 motor oil. We have a light on the side of our Banbury at each dust stop—just a reflector light—but it makes it easy for the oilers to inspect the rings and see that the oil is appearing where it should, and that the dust stops aren't dry. They inspect those daily, and they are supposed to do a good job. I think they do, and as a result of their inspections we very seldom have to drill out an oil hole on a dust stop. Another thing that is important and is recommended by Farrel-Birmingham is the operation of the floating weight. They recommend that it be allowed to fall down of its own weight, or else that it be brought down slowly and that it be left down for a short period of time before the full pressure is applied, and I believe they recommend a minute or something of that order.

Answered by Mr. Neschke: I think that maintenance is the complete answer to this dust stop problem. You have to live with that thing continually, and with the very best of maintenance you're still going to have a possibility of one of those oil lines plugging up. You might run a soft stock and the sponge will go right into the oil holes and plug them up. We take a hydraulic ram and grease gun and put oil in it and force that stuff through in excess of the pressure you would normally use in just the ordinary lubricator pressure, and we can keep the lines clean and clear. We keep a man on that platform all the time continually watching that. He cleans the rings and cleans any dust or any rubber that might have gotten by the ring or by the door. He keeps them scraped out, and in that way we can see just what lubricant we're getting through those rings. In that manner we've been fortunate in holding our dust down to a bare minimum. Then, too, we do have an exhaust fan system. If we do have a dust leak, it pulls the dust away from there instead of letting it accumulate.

Question—Are you able to force this plug out of this grease hole without releasing the tension on your springs?

Answered by Mr. Neschke: No, normally you should take the spring off. Every third week or so we like to pull the rings completely out, clean it out, check those passages, and then put it back in.

Answered by Mr. Davenport: We're using a small pneumatic motor now with a short drill, and in most of the plants we're able to drill out this plug without shutting the line down. However, we have four Banburys on a line, and usually when one gets plugged up we shut the line down, but on three of the rings we're able to drill out the plugs without shutting the line down by using the Chicago Pneumatic motor, which has just a short drill on it.

Answered by Mr. Uhrich: I might just say that I'm grinning here a little bit; you make it sound so successful. We have the insert to which the copper tubing is fastened, and when we get a plug, we just screw the insert right out of the ring and put another clean one in, and we have been able to get along faster that way. The question has been asked whether we're able to force them out. In our situation we found we use a hardened face ring and the hole in that was not always identical in diameter with the hole in the metal back of it, so we got a riveting effect, and we found it easier to take them out the other way, and we have used those plugs now for eight or ten years—just a screw plug that goes right in. We've recently had a proposal made, and we're trying it now. It sounds like it should be successful, and that is to put the outlet hole through the hardened face of the ring in at an angle so that it leads with the rotation of the ring. It sounds like it should be a good thing—whether it will be or not, we haven't had it long enough to tell. On your man cleaning them—we also have fellows clean them. I might say that our problem is not so much dust as it is the tailings that come out, and we have a man around there cleaning them. He works with a hook to keep the ring as free as he can keep it, and we don't know yet whether it's cheaper to keep a cow or buy the milk. We can keep the rings clean, but with his hook he usually breaks the oil lines, so if it isn't one thing, it's another.

Question—About how many tailings or pigments per Banbury per day do you get?

Answered by Mr. Uhrich: Some two years ago we adopted the step-up type door in our Eleven's, and we now have two of them at the Los Angeles plant, and all the parts that we buy from now on will be of that type. We had reports from our other plants about door tailings being as low as two pounds per day and we run probably 400,000 pounds per day through them. And so with a great deal of pleasure and anticipation, we started to put them in here.

Well, just within the past month I've written around to the engineers at other plants to find out definitely whether these reports are true. We get anywhere from 80 on some of our mixers, with the greatest amount of care, and that's not very much; we get as much as 180 and 200 pounds in the extreme, and then we have to do something about it. That's in a twenty-four hour period, and the amount that comes out of the ring in that quantity is a negligible amount. That's practically all door tailing. I think our problem has been primarily door tailings, because I believe our fellows insist on having the full pressure on the ram until the door is completely open, and maybe a second or two after that, so in the process of opening the door you just can't help when you drop the door down on a step-up door. You just can't avoid, in our opinion, getting a lot of tailings from the door. However, our other plants have gotten off that two pounds in twenty-four hours, but on the general run of ours, we run from 80 up to 180, 190, and 200.

Question—What pressure do you use on your floating weight?

Answered by Mr. Uhrich: We use 65 pounds when we are in a position to observe it and keep it down to 65 pounds, and we use the 11-inch cylinder on ours.

Answered by Mr. Davenport: Well, we have an 8-inch and we use 125, and that's just about the equivalent.

Question—For maintenance work, what tools should be furnished by the company and what tools should be furnished by the employee?

Answered by Mr. Davenport: It has been standard practice with us at Firestone ever since the plant started that the mechanics furnish their own small tools, i.e., their hand tools. We furnish the larger tools. In addition, we have equipped each mechanic with a small "tool buggy," as we term it. The tool buggy is about 18 inches wide, 27 inches high and 30 inches long. It has a good set of heavy-duty casters on it, and contains a set of drawers and small containers. These containers hold small set screws and diamond roller chain attachments so that the mechanics can do about 90% of their work without running to and from the spare parts or store room. We also furnish the mechanic with drills, drill motors and a three-quarter ton Yale lift. When fully equipped, some of these tool buggies weigh 400 or 500 pounds. The mechanics accumulate a little of everything in there. We have found, however, that it really pays to furnish them with the drill motors and things like that.

Question—Could you say it in the form of what tools you require the man to bring himself?

Answered by Mr. Davenport: Well, when I say small hand tools, it will be hammers, chisels, open-end wrenches and socket wrenches up to one inch (above one inch we

furnish ours). The majority of our fellows, I'd say, have from $200 to $300 worth of tools. Now I'm speaking of maintenance mechanics. The pipe fitters are furnished with the same buggy. We furnish them with wrenches, hammers, and chisels, and they of course bring their own small hand tools, such as pliers, chisels, small wrenches and things like that. It took us quite a while to get them all equipped with these, and we figured we were supplying all the home garages and everything, but I think it works out and I think it pays off.

Answered by Mr. Uhrich: It's a very active question with us, and each year when we renew our contract with the union there is continual pressure to reduce the number of items the employee has to furnish and push it over on the company. We require around $350 or $400 worth of tools of the fellows in the machine shop on the machine tools. On our maintenance mechanics, I'm afraid we close our eyes. The guy with a hammer and chisel and wrench that he carries in his back pocket manages to get by, because he can go to the tool room and get everything he wants. We of course furnish everything like a drill motor and that sort of thing.

Question—Is there a standard rule of thumb for when the clearance of a tuber is excessive, and if so, what is it?

Answered by Mr. Uhrich: We don't have a rule of thumb to tell when it is excessive, but if we get somewhere around seven or eight-thousandths per inch of diameter on a six-inch tuber—that would run forty-five to fifty-thousandths in diameter—we wouldn't necessarily take it out to restore the clearance to a new clearance; but if there was any stock problem where we were getting curved lumps in stock or that sort of thing, that would be the first thing that would be looked at as being the cause of it, in which case we would take it down. However, we have had many running with clearances up to eighty and ninety thousandths and didn't get into trouble. A lot depends on the particular stock that you're extruding.

When we restore them, we put them down to one thousandths per inch of diameter, and do not go below six thousandths. That is, if we have a 2½ inch tuber, we would get that down to five or six thousandths, or maybe seven, but on a six-inch, we would stick pretty close to the six thousandths, and on the ten-inch, to the ten thousandths. We have had them up to one hundred twenty-five thousandths and continued to run, because the particular stock being extruded from that tuber did not give any trouble, and then we'd reduce that clearance at the Production Department's convenience, when they could give us the tool machine.

Question—How much clearance per inch of diameter should be allowed when rebuilding the tuber screw and inserting liner?

Answered by Mr. Cook: I hope I don't confuse anybody if I give a little different answer. Taking some common sizes of tubers, the clearance on restoring a screw we figure should be about eight thousandths of an inch on a two and a half-inch tuber; on a six-inch tuber, about twelve to fifteen thousandths on the diameter, and for a larger tuber, such as a ten-inch, about seventeen to twenty thousandths. Commenting upon the maximum clearance, we figure that, too, should be dependent upon the diameter of the screw. That would be on a two and a half-inch tuber, about thirty thousandths of an inch; on a six-inch tuber, about fifty-five thousandths, maybe, and on a ten-inch, about sixty to sixty-five thousandths. As a matter of practice, I know we run them with a lot larger clearances than that, but that's what would be recommended. The second part of this question is about inserting the liner, and the manufacturer recommends about one to two thousandths of an inch there, preferably on the low side.

Question—What is the maximum peripheral clearance on Banbury rotors before overhauling is necessary for a 3, 9 and 11 Banbury?

Answered by Mr. Davenport: We don't have a 3 or a 9. We have all 11's, and I would judge the clearance on 3's and 9's would be comparable to the 11's. We start out with three-sixteenths of an inch clearance, and they tell us when we get up to seven-sixteenths, we should take it out, but I think that depends largely on the type of stocks that are in your batches, the size of your batches, accelerators being used, and a lot on how bad they need the Banbury. If production is tough, and they need it, they may go higher. I remember several years ago, back in the early Thirties, I got called down on one of our Banburys. They said they had a water leak and I went down and found out we had gone clear through the castings into the spray side.

Answered by Mr. Cook: We have number 27's, and we went through our spray sides about a year and a half ago, too, and of course that was well over an inch, and for the clearance on a new 27, we go three inches.

Answered by Mr. Kotich: I might add that our Banbury No. 11 has close to one inch clearance. Of course, we're getting ready to replace it.

Question—On journal lubrication of mills, which is more adequate: grease or oils?

Answered by Mr. Neschke: That's a problem that's going to be dependent upon the type of mill you have. Probably the ideal system is to flood lubricate it with grease—the return system—and flood the oil through it. You get a cooling effect, and you get all the benefits of cold, fresh filtered oil into the bearings continually. The oil is ideally suited for something of that nature, in my opinion, and when you get into grease or oils on some of the older types with a lot of clearance, oil won't be too practical. One thing, we that sit up here at this end of the table have to fight with some of the fellows out there is in getting contamination of grease and oil into stacks, and frankly, I would prefer to use grease, because we can control it a little better than oil.

Question—Do silicone greases have a place for lubrication on such things as hot bearings on mills and Banburys?

Answered by Mr. Cook: I think a definite answer of "no" can be given on that. A silicone grease has a high resistance to temperature. They use them on ball bearings up to 400°F. and over. They're compounded from certain silicone oils along with the thinning agent, like a metallic soap, but they're not recommended for plain

bearings, and they're not good for high pressures, and even if it weren't for that, the high cost would probably make it impractical to use those types of greases. Incidentally, we use that old remedy of sulfur and castor oil on our hot bearings. I suppose everybody has had experience with that.

Answered by Mr. Neschke: There are several other additives now on the market, and the oil companies don't frown on them. I have used them and had very good success with them on cooling down bearings that have gotten away from you. As a general practice, however, we don't use them for other than cooling down a bearing. We have had bearings that have run beyond their life, and we knew it, but have used such methods to keep them going longer.

Answered by Mr. Cook: The nice thing about that is those materials are handy in the rubber plant, and you can take them in the cement room and mix them up easily, and they'll also flush a bearing out good, and get the temperature rise stopped, and pretty soon the bearing will start cooling down.

Question—What is the best type of oil seal to use on mill line bearings?

Answered by Mr. Kotich: Evidently this question refers to flood lubrication such as discussed before. I think for flood lubrication, you're almost limited to the closure type for the modified "U" type of seal. This type of seal, made by Garlock and Johns-Manville, usually has a very heavy heel and a slight lift held in place by some sort of spring. Garlock has a spring that's molded right into the ring. It's a fine gear type spring. The ring itself is split, so you can put it over the mill without tearing your mill apart, which of course is impractical. Johns-Manville has pretty much the same type of seal except that they use a long spring that you hook together after your seal is in place. For this type of seal, of course, you've got to use seals both on the inside and outside of your journal to seal the oil in. We have had very good luck with the Johns-Manville type—what they call a hard heel packing. It gives you a fairly good seal. There is always some leakage out of these seals, you might say. I have yet to see one you can seal off absolutely tight, and we have had very good results with this type of seal. I don't think you could use packing or anything of that type because of the nature of the plugs.

Question—What type of water treatment is recommended for cooling tower water used to cool mills and Banburys for least maintenance cost?

Answered by Mr. Cook: Our water is a recirculated water system for mills and calenders. It happens to be a refrigerated system rather than a cooling tower system, but it is recirculated. The water leaves the refrigeration unit at about 42° or 44°, and it comes back about 10° hotter. Because of those low temperatures, we're not troubled much with calcium or magnesium. Our main trouble is iron. That iron just forms a sort of mushy mud. It can easily be brushed out, but of course you can't get at it. The treatment we use is a chromate treatment. We have iron in the water about one-eighth part per mil, which is about four and a half times the concentration that we have in the water coming out of our wells for a raw water supply, and in order to control that iron, these chromates evidently form a coating or a skin in the system and prevent the iron oxide from causing trouble. As far as the quantities, we use one part in approximately one pound to every 1100 gallons of water, but since our make-up is about 3000 gallons a day, we use less than three pounds, at about 25c a pound. That's about 75c a day it costs us. Incidentally, it is added directly in our flume. It comes in the form of balls and we just put them in the flume in a basket.

Question—Is refrigerated cooling justifiable from a maintenance cost saving for mills, tubers and stock cooling operations?

Answered by Mr. Kotich: I think the answer to that is a definite "no." I can't see where you'd save anything on maintenance costs by using cold water, except possibly on journal bearings and things like that, and I don't think you could even consider that a savings. In fact, you'd be adding to your maintenance cost because you'd have the cost of the refrigeration equipment and its maintenance, and it could run high. You've got the unit itself, you've got the unit to cool your condenser water, so rather than reduce costs, I think a refrigerated cooler adds to your maintenance costs.

Question—Is there any automatic type set-up to tell you when a Banbury or mill bearing is running excessively hot?

Answered by Mr. Davenport: Yes, there are numerous set-ups on the market that you could get to install on your bearings. Fortunately, or unfortunately, we do not have any at Firestone. We do have a thermostatic unit set up on our large compressor that proves very successful, and it could be installed on the Banburys. It rings a bell up in our dispatcher's office. I'm just wondering if by having such a set-up, you might not depend too much on that and forget the physical and manual checks, and I'm just wondering if you wouldn't run into more trouble with than without. I'd just like to know if any of the other local companies have such a set-up.

Answered by Mr. Uhrich: We have nothing like that. I feel like you do that personal attention is a great deal more important than any automatic device or alarm device could ever be. The tendency with those things is to count on them too much, and nobody ever goes near it. We have quite a little trouble with hot bearings because we do overload our equipment. But we keep it going either with an air hose, or in some cases a water hose, until we can get to it, and unless flames come out we rarely shut down.

Answered by Mr. Cook: We had an alarm system set up on our Banburys. It wasn't operated by temperature, but by pressure, and when the pressure failed our alarm bell rang. Instead of reporting it, they tore it off the wall. They didn't like the noise.

Question—What is the best way to keep the inside of mill rolls clean?

Answered by Mr. Holman: I believe an acid treatment about once every year or every two years, depending on use, followed by flushing and neutralizing, and then flushing, is probably one of the simplest and most effec-

tive ways. A good water treatment, of course, will preclude the necessity of the acid treatment on the mill rolls. Mr. Davenport has indicated that his company back East periodically will drop a chain in the roll and let that roll for a while, which may have certain advantages that we never consider here, but in general, the acid treatment will probably keep the rollers in good condition.

Question—What is the best way to keep Banbury spray nozzles from plugging up?

Answered by Mr. Kotich: As far as I'm concerned, that's to keep the water clean. Make sure the curtains on your Banbury spray sides are clean, and keep the dust out, and don't build up a sludge in there. Treat your water if necessary, but basically it's just a matter of keeping your cooling tower free from oil and from foreign matter. Be sure your pipes are clean. Make sure there is no dust getting back into your system.

Question—Is there a standard practice to the repair and maintenance of a machine, or is it a hit and miss deal?

Answered by Mr. Neschke: There are two phases to the maintenance business. One is preventive maintenance, which we all like to do and sometimes can't because we can't get to it, and the other is breakdown maintenance. Preventive maintenance in many plants is a separate function headed by different people than the breakdown crew. We put a man on the Banbury, as previously mentioned, to maintain that one machine. The biggest problem, however, is how in the world are you going to maintain something when that thing is going five miles a minute? You don't grease a truck while its running, but we try to maintain our rubber machinery in that manner.

Question—Getting back to the Banbury, as far as general bearing failures, which is the greatest offender of the four?

Answered by Mr. Davenport: We have lost more bearings, I'd say, on the long rotor on the bull-gear end. We have more trouble with that bearing than with all the other bearings put together.

Answered from the floor: I would say that 95% of our failures are on the short rotor.

Answered by Mr. Uhrich: That has been our experience, on the short rotor on the drive end.

Answered by Mr. Cook: I would agree with Ed Davenport.

Answered by Paul Oliver (from the Floor): I have found the short roller bearings on the drive end will go out twice to once on the long rotor ones.

Question—Do you find a difference in the amount of maintenance on a tuber using herringbone gears and one using plain or cone worm gears?

Answered by Mr. Davenport: I think it has been proven over a period of years that you have less maintenance on herringbone gears that are installed in tubers over plain or cone worm gears. The advantages over the plain or cone worm gears are more pronounced under the conditions of heavy loads, continuous duty and high speeds. The life of the gears are longer due to the double angle tooth formation whereby the load is distributed over a greater area. Back lash and end thrust are eliminated because of the double helix angle cut of the teeth. You have less friction and power consumption. These are just a few of the reasons why the use of herringbone gears in present day tubers have certain advantages over plain or cone worm gears.

Question—Does the bucket type of steam trap give less trouble than the trickle trap?

Answered by Mr. Cook: It is assumed that by "trickle trap" the question referred to either an impulse or thermostatic type of trap. These traps operate more smoothly than the bucket type of trap. It is not necessary to change a seat in one of these traps when the steam pressure is changed and they cost considerably less than the bucket type of trap. Our experience has shown us that they are also easier to maintain. For these reasons we would say that a trickle trap is preferable to the bucket trap for most general purposes, such as dryers, unit heaters, kettles, hot water heaters, preheaters, radiators, storage tanks, process tanks, drying drums, liner ironers and the like. They should not be used for all purposes, however. For installations such as pot heaters, platen presses, plastics presses, large outdoor steam lines and the steam mains to engines, turbines or pumps, the bucket type of trap is to be preferred because of its rugged construction and because very large volumes of condensate can be removed quickly.

Question—From a maintenance point of view does chrome plating of rams pay for itself?

Answered by Mr. Kotich: I believe that hard chrome plating of rams will definitely pay for itself from a maintenance point of view. It pays in two ways: one, there is a reduction in friction between the packing and the ram; and two, the hard surface is less subject to surface damage. The two plated rams we have are in excellent condition after several years of service, and the packing on these two consistently outlasts those on the other presses.

Question—How frequently should press platens be resurfaced for good contacts with molds?

Answered by Mr. Holman: We resurface platens only when flash difficulty is encountered, when a new or different size mold is to be run in the deck, or when the platen is damaged. We specify only a 50% clean-up with no area larger than ½-inch diameter.

Question—What is the best method to check roll box temperatures?

Answered by Mr. Holman: The old-fashion method—by hand—is the most practical. On critical bearings, special alarm equipment can be installed, and simple facilities are now available for shutting off the motor if certain bearings exceed set temperatures.

Question—What is the best practice on safety caps for mills?

Answered by Mr. Holman: We have both cast and steel shear disc type safeties. We prefer the steel shear disc for lower cost, quicker replacement and reliability. We are, however, converting to a new all-hydraulic type which consists of a pair of hydraulic caps, an hydraulic pressure switch and a pressure gage. The switch is adjusted to open the motor circuit at excessive bearing loads, and the pressure gage permits the operator to load the mill to capacity with security. At overloads the motor circuit is opened and the mill stops instantly. As soon as the load is cleared, the mill can be restarted in the usual manner.

Answered by Mr. Uhrich: So far as we know there is no "best" practice. We use a shear disc. Its strength is a compromise between the load application at one end of the roll and the load in the middle of the roll which distributes the end reaction to both bearings.

Question—Are there any special maintenance problems on the adjustable camelback heads?

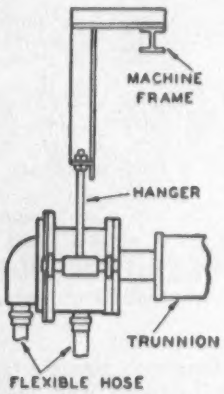
Answered by Mr. Uhrich: At our plant we have, I believe, the first 8-inch head made. We have had nothing that could be called special maintenance problems, but several parts were made stronger to withstand the pressures our stocks developed. Normal wear and tear on our head consists of stripped threads on adjusting screws and an occasional bent gate or blade.

Question—Do you have less problems with a drilled or open center type platen?

Answered by Mr. Uhrich: We have nothing that could be called a maintenance problem on either type.

Improved Johnson Type "L" Joints

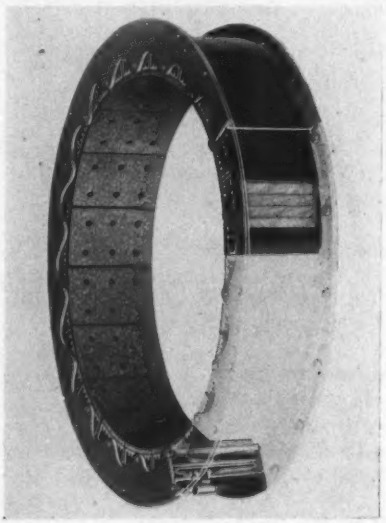
Availability of the popular Type "L" Johnson rotary pressure joints in all sizes of the standard Johnson joint has been announced by the Johnson Corporation of Three Rivers, Mich. Of further interest where the Type "L" is concerned is the development of a novel suspension method of support. The Type "L" is a modification of the standard Johnson joint especially developed to facilitate the proper mounting so important to proper joint operation. It is built with lugs cast on the body to permit use of simple rods to support the



joint. By this arrangement, the weight of the joint proper and its steam and condensate connections is removed from the all-important sealing mechanism. The entire assembly is "floated" within the housing—free to take full advantage of the lateral flexibility provided in all Johnson joints. Since all operating parts are relieved of unnecessary wear, the Type "L" is said to assure even longer life and even more trouble free service. An interesting illustration of the adaptability of the Type "L" is the use of adjustable hangers for suspension support of the joint. By the use of such hangers, attached to the rods of the "L," the joint can be suspended from the angle iron machine frame. The manufacturer reports that this method is growing in popularity. Type "L" Johnson Joints are available for use with stationary or rotating syphon pipes.

Fawick Type VC Air-Ring Clutch

The Fawick Type VC Air-Ring Clutch, a new air-operated industrial clutch, has been introduced by the Fawick Airflex Division of the Federal Fawick Corporation, 9919 Clinton Road, Cleveland 11, Ohio. This completely ventilated clutch of the rigid type provides for transmission of power from the friction shoes through the torque bars to the metal side plates of the



assembly. Field tests of the new unit reveal that it is unmatched for heavy-duty service with high-starting loads and sustained slippage where generated operating heat lowers clutch efficiency and shortens operating life.

Unique design features found in this new air-operated clutch include: cooler operation inherent in drum clutch design plus isolation of the operating tube from the heat-generating friction surface; riveted, replaceable friction lining, and loose, expanding operating tube which can be replaced without removing clutch from shaft. The new unit is manufactured in sizes ranging from 12-inch through 42-inch drum diameters with torque capacities ranging from 27,000 inch pounds to 380,000 inch pounds.

Editorials . . . . . .

Political Football

AS REPORTED elsewhere in this issue, the House of Representatives has passed the Shafer Bill (HR 5425) providing for disposal of the government-owned synthetic rubber manufacturing facilities. This was accomplished by voice vote on June 25, following extended public hearings on the bill. Shortly thereafter, following an abbreviated public hearing, which witnessed the presentation of duplicate testimony, the Senate Banking and Currency Committee approved the Capehart-Bricker Bill (S 2047). The latter bill, which differs in some respects from the House version, will now have to be reported to the floor of the Senate for a vote.

It could be assumed from the above that early passage of legislation covering disposal of plant facilities can be expected, but unfortunately for both the industry and the public such is not the case. There is a very large fly in the ointment, and its name is politics. Although there was complete harmony on the part of the subcommittee of the House Armed Services Committee which heard testimony on the Shafer Bill, and later on the part of the full committee which voted out the bill, and still later on the House floor when the bill was passed, the Capehart-Bricker Bill ran into trouble in the Senate Banking and Currency Committee. Although that committee approved the Capehart-Bricker Bill on July 8, it did so over the strong objections of the democratic members of the committee.

The objections of the dissenting Senators have taken a more serious turn in the past few days with the preparation of a minority report which threatens a major fight in the Senate on the over-all disposal plan, a fight drawn strictly on partisan grounds. This report, believed to have been written by Sen. Paul Douglas (Dem., Ill.), and signed by five of the six democrat members of the Banking and Currency Committee, calls the disposal plan "grossly defective", charges that it would result in "a more or less forced sale" of the government-owned facilities, and alleges that it would re-establish a "cartel" in the rubber industry. On the cartel score, the report recalls the anti-trust suit brought by the government against the major rubber companies in 1947 and points out that these companies "pleaded no defense in United States District Court to charges by the Department of Justice that they fixed prices collectively on major items of goods they sold." Other objections were also voiced, including one on negotiation procedures established in the bill.

The minority report, as indicated above, contains some harsh accusations, but they hardly seem to fit in with the facts. For example, both the House and Senate measures provide for final Congressional approval of any or all sales to make certain that the taxpayers get "fair value" for the plants, that small business is treated equitably, and that national security is strengthened under private ownership. Further, the bills require approval of sales by the Attorney General, which provides assurance that no monopoly will be created. These are some of the facts which have been stressed by A. L. Viles, president of the Rubber Manufacturers Association, in a letter sent to each member of the Senate.

The rubber program since 1942 stands as an unparalleled example of cooperation between industry and government, and throughout that period the public interest has been the overriding consideration. The program has been reviewed by Congress on four separate occasions since March, 1947, and the Rubber Act of 1948, which has been unanimously approved by both parties of Congress on three occasions, contains a clear statement of policy directing the disposal of government-owned synthetic rubber facilities to private industry when such action becomes consistent with the objectives of national security. It is readily admitted in both government and industrial circles that such objectives have been reached, and to deter disposal now because of purely partisan issues would be unfair to the industry and to the public. It should be emphasized that even the natural rubber producers look forward to private operation of all synthetic rubber facilities so that a truly free market in rubber can be established.

We can appreciate the concern expressed by some of the small and medium size rubber manufacturers with regard to depending on competitive firms for their supply of a basic raw material, but as pointed out in these columns last month, such concern is groundless. The anti-trust laws of the country are sufficient guarantee to avoid monopolistic operations in synthetic rubber. An even better guarantee will be the competition inherent in the field when production is completely in private hands. If this is the prime concern of the dissenting senators we welcome their objections; if their objections are purely partisan, we deplore them.

NEWS OF THE MONTH

SENATE COMMITTEE APPROVES DISPOSAL BILL AS HOUSE PASSES SHAFER BILL BY VOICE VOTE

THE Senate Banking and Currency Committee, on July 8, approved, over the strong objections of its Democratic members, the bill authored by Senators Capehart (Rep., Ind.) and Bricker (Rep., Ohio), calling for the sale of twenty-eight synthetic rubber facilities by July 1, 1954. Earlier, on June 25, the House version of the measure as drawn up by Representative Paul Shafer (Rep., Mich.), was passed. The Senate bill was to have been reported to the floor on July 14, but hopes for its passage at this session are reported to be slim since Democratic members of the Senate will undoubtedly contest the proposal. Indicative of the opposition expected to rise on the Senate floor was a statement issued by Senator Paul Douglas (Dem., Ill.), which characterized the disposal plan as a "give-away" which would lead to "forced sales to present operators at prices grossly below fair value."

The Senate bill differs in some respects from the companion measure already passed by the House. It would do these things:

(1) Authorize a special three-man commission appointed by President Eisenhower to negotiate sale of the plants to private industry. The commission would have between forty-five and ninety days within which to accept bids, after a twenty-one day period of spreading information about each of the plants, their worth, capacity, and similar statistics.

(2) At the close of the bidding period, the commission would negotiate with those who have submitted proposals "for the purpose of entering into definitive contracts of sale."

(3) The commission would report to Congress by next June 1 with final details of its disposal contracts for a review by the legislators. Congress would have thirty days to veto the commission's program, otherwise, it would take automatic effect.

(EDITOR'S NOTE: A full report outlining the basic differences between the original House and Senate measures appeared in the June issue of RUBBER AGE).

Mounting Democratic Opposition

With mounting opposition by Senate Democrats it has become apparent that disposal has become a partisan matter. Senator Douglas, speaking to reporters after the Senate Banking and Currency Committee had approved the bill, stated that the "government will negotiate with a pistol at its head" because the bill allows only six months' time to complete negotiations. He also said that the committee's action "will perpetuate the present control of the rubber industry by the five large companies which control 88% of the industry."

Senator Capehart, chairman of the committee, who was present when Senator Douglas talked with reporters, said the "language of the bill does exactly what Senator Douglas is talking about, since it affords ample protection in that the Attorney General must be consulted and Congress must review the disposal plan. I would certainly vote to disapprove if the plan comes back to us and fails to provide enough competition, the companies don't have a fair opportunity to bid, or the government did not secure fair value—the actual worth of the plants as a going concern, not based on original cost of depreciated book value."

Both the bill passed by the House and the measure approved by the Senate Banking and Currency Committee now provide for an independent commission to handle negotiations and report back to Congress next June. Both measures also require the commission to sell enough plants to produce at least 500,000 tons of GR-S and 43,000 tons of Butyl annually. The disposal commission, under both bills, is instructed to insure a competitive pattern of private ownership and assure that continued supplies of rubber will be available to small users from those buying the plants.

The bills both permit a maximum down payment of 25% and ten year payment of the balance at interest of at least 3% annually. The Senate bill requires a bidding deposit equal to 2.5% of the gross bid, but no more than $250,000 for each facility. The House figure is 10%, but not exceeding $500,000.

Most of the industry representatives who appeared before hearings of the House Armed Services Committee also testified at hearings held by the Senate Banking and Currency Committee. It developed that a large segment of the industry favored the Shafer bill over the Capehart-Bricker bill. P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., avoided taking sides between the two bills, but suggested Bernard Baruch, James B. Conant and Karl Compton as logical choices for the Shafer bill disposal commission. The Senate bill gives final authority to a disposal commission headed by the Secretary of the Treasury with the Attorney General and Commerce Secretary as other members.

Predicts Price Rise

In an appearance before the Senate committee, Morton Yohalem, an official of the Reconstruction Finance Corporation who is working on the plant disposal problem, estimated the price of synthetic rubber might go up three cents a pound when the plants are sold.

Kenton R. Cravens, RFC administrator, told the committee he agreed that the price of rubber would go up somewhat. He was more optimistic than Mr. Yohalem, however, that competition and technological improvement would shake down the price.

Senator Douglas commented that he had read in a publication connected with the Malayan natural rubber industry that the price of natural rubber would jump seven cents a pound—from the present 23c to 30c—when the synthetic plants were sold. Mr. Yohalem agreed with Senator Douglas that the price of natural rubber would go up the same amount as synthetic, but said 26c was the more likely price for the natural rubber after sale of the plants, instead of 30c.

Mr. Yohalem declared that one big factor in the price rise would be separation of the synthetic rubber manufacturing process into segments when private industry took over. The government runs them as one integrated operation.

Butadiene is the most important ingredient in synthetic rubber, Mr. Yohalem pointed out. When this is manufactured separately by private industry the operator will take a profit that will be reflected in a higher price for the final product, he said. He added that higher taxes and depreciation charges also might contribute to a price rise. He emphasized that the plants pay local real estate taxes now.

Mr. Cravens said there would be an immediate price rise because the change-over to private operation would result in some loss of efficiency for a while.

In reply to a question by Senator Douglas, Mr. Yohalem said a price rise of 3c a pound might raise defense costs to the government $3,000,000 annually. Senator Bricker suggested that this could be offset by federal corporation taxes that the buyers would pay. However, the RFC officials said that was impossible to estimate. They noted that the plants were making a profit of $62,000,000 for the government this year.

Senator Douglas expressed alarm at statements which he said had been made in the House picturing the twenty-eight plants as worn out and not worth much. Mr. Cravens and Mr. Yohalem said that was not their view. They asserted that the plants were in good physical condition and that they expected to get a good price for them.

Mr. Yohalem predicted that the present operators of the plants, largely the nation's rubber companies, would be successful bidders for most of them. However, he said, some outside interests might get into the picture.

Earlier, the Senate committee had received testimony that the government-owned alcohol-butadiene plants at Kobuta, Penna., and Louisville, Ky., are not saleable at reasonable prices but should be leased to private industry. This view was expressed by Lawrence Brown, representing Publicker Industries of Philadelphia, Penna.

Doubts Reasonable Bids

Mr. Brown told the committee "there is no possibility of obtaining a reasonable price, or possibly any bid at all," if the Kobuta and Louisville plants are offered for sale. Each, he said, has too big a capacity for private commercial operation. He suggested leasing them at a figure based on capacity operated. The rest of the productive capacity should be kept in standby condition for national defense in event of need.

It is interesting to note that on July 1, RFC shut down one of the alcohol-butadiene units at Louisville, leaving the agency with three others in operation — two at Kobuta and one at Louisville, Ky. Each of the three is producing alcohol-butadiene at a relatively low level, 1,800 tons per month. RFC is understood to have enough alcohol on hand or on order to operate the three butadiene units until September 1 at the projected level of 5,400 tons a month. The agency is said to have a sufficient inventory of butadiene to permit the continued production of rubber at the current level of about 65,000 long tons a month.

After July 1, alcohol-butadiene became the base material for about 6,800 long tons of this monthly rubber output, with petroleum-butadiene making up the balance of nearly 60,000 tons.

RFC officials have not said whether they will cut out the remaining three alcohol-butadiene lines when current supplies of alcohol run out, a date now estimated as September 1. RFC has also not disclosed its plans for returning to the alcohol market to purchase additional quantities when present supplies run out.

New Carbon Black Process

According to recent reports, carbon black is being turned out at the record-breaking rate of 5½ pounds per 1,000 cubic feet of gas in a pocket size experimental plant built by Rice P. Lynn of San Angelo, Texas. The normal yield is about ¾ pound. The secret of the greater recovery is the collection of fine particles by electrostatic means in a special accumulator. The inventor figures a full-scale plant would cost $25,000, roughly 1/100th the cost of a conventional unit handling a similar amount of gas.

House Testimony Highlights

The testimony presented at the hearings held by the House Armed Services Committee before that committee approved the Shafer bill gives ample evidence of the divergent views held by the industry and other interested parties. In the concluding days of the hearings, a great many factors having to do with disposal were touched upon. These matters were also discussed, largely by the same people, before the Senate Banking and Currency Committee.

At the House hearings, industry and union witnesses uniformly urged disposal at once and were in general agreement on the Shafer bill. There appeared to be general agreement by the committee and most of the witnesses that the alcohol-butadiene facilities at Institute would not likely attract bidders.

Several witnesses suggested that by limiting the maximum copolymer capacity a given company or group of companies might acquire, the committee might assure a broader and more competitive base of ownership. One suggestion was offered that historic use patterns of bidders might provide such a yardstick. The committee was apprehensive that any limitation on bidding might militate against realizing the top price for facilities.

Testimony developed differences over a relatively minor provision of the Shafer bill—the section which would continue operation of the government evaluation laboratory at Akron during the fiscal year following the fiscal year in which the transfer period terminates. Suggestions from witnesses ranged from recommendations for a complete withdrawal of the government from the research picture to a continuance of the Akron laboratory for five years to do research work on contract and at the expense of private concerns.

Witnesses were divided on provisions of the bill relating to earnest money required with bids, interest provisions and terms of payment. Several endorsed the requirement of a bid deposit of 10% of the gross bid up to $1,000,000 on the grounds that it would help screen out speculative bidders. Others argued that if the terms were so high they would tend to narrow the field of bidders.

On the basis of interest expressed by many witnesses, Mr. Shafer predicted that many companies besides the industry's "Big Four" will enter bids for the synthetic rubber facilities. Among witnesses who expressed such interest were A. L. Freedlander of the Copolymer Corp.; Thomas Robins, Jr., of the Kentucky Synthetic Rubber Corp.; O. V. Tracy of the Esso Standard Oil Co.; R. W. Thomas of the Phillips Petroleum Co., and Charles F. Johnson of the Endicott Johnson Corp., who was speaking for the American Biltrite Rubber Co., Cooper Tire & Rubber Co., Johnson Rubber Co., and the Wooster Rubber Co.

Joseph W. Crosby of the Thiokol Corporation, told the committee that his company intends, dependent upon suitable financing arrangements, to build a Butyl plant under licensing arrangements with Standard Oil. In total, this would represent expressions of interest on behalf of 37 firms, exclusive of the five leading rubber companies.

Industry witnesses generally urged the committee to provide for building up the largest possible inventory of synthetic rubber prior to transfer—up to 200,000 long tons. It was brought out that the Synthetic Rubber Division of RFC was confronted with a Budget of the Bureau proposal to place a 52,000 ton ceiling on RFC's inventory accumulation. The committee took the position that a substantial inventory would be needed to tide small users over the transition period.

Several witnesses complained that the Shafer bill as proposed did not leave a long enough period for bid taking. Both the chairman and the committee seemed to be pleased with the testimony of witnesses who, speaking for the smaller rubber manufacturers, expressed no fear of being able to obtain their synthetic rubber requirements from private owners of the plants. The universal industry view that national security would be strengthened by private operation was shared by U.R.W. witnesses, who predicted that production would expand rapidly to meet increased demand after the transfer period.

Processing Oil Interchangeability

RFC has determined that effective with production on July 1, 1953, certain oils used in the production of oil masterbatches will be used interchangeably. With respect to those oils used in the program, Shell SPX 97 and Sundex 53 will be used interchangeably. Likewise, Dutrex 20, Califlux TT and Philrich 5 will be used interchangeably. Circosol 2 XH, which is relatively non-staining, will not be interchanged with any other oil at this time. In another part of this issue there appears a list of oil masterbatch polymers which will be produced by the Office of Synthetic Rubber beginning July 1, 1953. It will be noted, that, except for the aforementioned oil interchangeability, no changes have been made. Complete details on the new program will appear in our next issue.

GOODRICH ORGANIZES TWO MAJOR DIVISIONS INTEGRATING ACTIVITIES

Organization of two major divisions of the B. F. Goodrich Co., integrating sales, manufacturing and necessary staff functions has been announced by John L. Collyer, president. Arthur Kelly, a vice-president of Goodrich, has been named president of the B. F. Goodrich Company Tire and Equipment Division. Clyde O. DeLong has been named president of the new B. F. Goodrich Company Industrial Products Division. Mr. DeLong formerly was general sales manager of the company's Industrial Products Division.

Clyde O. DeLong

Named by Mr. Kelly as vice-presidents of the new Tire and Equipment Division are Joseph A. Hoban, former general manager of tire merchandising, who becomes vice president-replacement sales; E. F. Tomlinson, former general manager of the Automotive, Aviation and Government Sales Division, who becomes vice president-equipment sales; and J. E. Gulick, former general manager of tire manufacturing, who becomes vice president-manufacturing.

As vice-presidents of the new Industrial Products Division, Mr. DeLong named Robert V. Yohe, former president of American Anode, who becomes vice-president-sales; and Rollin D. Hager, former general superintendent of the company's industrial products manufacturing in Akron, who becomes vice president-manufacturing of the Industrial Products Division.

Commenting on the establishment of the newly formed divisions, Mr. Collyer said "The continuing diversification and growth of the company's business, both presently and in the future, indicate the announced form of decentralized responsibility for operation to be in the best interests of the company, its customers, employees and stockholders."

Biographical Data

Arthur Kelly, newly-named president of the B. F. Goodrich Company Tire & Equipment Division joined the company in 1925 as a chemist, shortly after his graduation from Purdue University. He served in the Compounding and Tire Construction Departments of the company's Tire Manufacturing Division, and in the Technical Department of the Processing Division before being transferred to the company's tire manufacturing plant in Los Angeles, Calif. Mr. Kelly was in Japan for several years before being recalled to establish new plants at Oaks, Penna., and Clarksville, Tenn. He returned to Akron as superintendent of Plant 4 in 1941. During World War II, he supervised the construction and early operations of the Lone Star Ordnance Plant, Texarkana, Texas. He also directed construction of four government-financed plants for the production of synthetic rubber. Mr. Kelly became vice-president in charge of manufacturing for Goodrich early in 1953.

Clyde O. DeLong, newly-named president of the B. F. Goodrich Company Industrial Products Division, has been with Goodrich since 1928, starting as a clerk in the Industrial Products Sales Division. After sales assignments in Chicago and New York, he was made operating manager of the Industrial Products Sales Division and, in 1946, became division merchandise manager. In 1949, he became sales manager of the company's Plastics Products Division and, a year later, was made general manager of the division, responsible for manufacturing and sales. On June 1, 1952, Mr. DeLong became general manager of the Industrial Products Division. He is a graduate of Miami University, Oxford, Ohio.

Joseph A. Hoban, who was named vice-president in charge of replacement sales for the B. F. Goodrich Company Tire and Equipment Division, began his career with the company in 1919 following service as a Naval officer in World War I. He is a graduate of St. Xavier University and the

Arthur Kelly

University of Cincinnati. After experience as a tire salesman he became assistant manager of the company's Cincinnati, Ohio, district. Later, he was named district manager at Pittsburgh, Penna., zone manager at Chicago, Ill., and merchandise manager of the Retail Division. Mr. Hoban then became manager of the Automobile Tire Department and manager of retail sales before becoming general manager of tire merchandising.

E. F. Tomlinson, who has been named vice-president in charge of equipment sales for the B. F. Goodrich Company Tire and Equipment Division, joined the company in 1927. He has had extensive experience in sales divisions of the company both as a salesman in the field and in sales management. Mr. Tomlinson has been manager of retail farm tire sales, representative of the Automotive, Aviation and Government Sales Divisions in Chicago and Milwaukee, and handled special company assignments with the Armed Forces during World War II. He became general manager of the company's Industrial and General Products Sales Division in 1949 and in 1952 was made general manager of the Automotive, Aviation and Government Sales Division of the company.

J. E. Gulick, newly-named vice-president in charge of manufacturing for the B. F. Goodrich Company Tire and Equipment Division is a graduate of the University of Akron. He joined Goodrich in 1927 as a tire development engineer. In 1932, he became Akron Tire Division production superintendent and later Tire Division staff superintendent. Named factory manager

J. E. Gulick

J. A. Hoban

E. F. Tomlinson

R. D. Hager

R. V. Yohe

of the company's Canadian plant in 1934, he became manager of interplant operations in 1940. He made a survey of plants in Europe with which his company had association in 1939 and a similar survey in South America in 1940. In 1941, Mr. Gulick was named factory manager of the company's tire plant in Los Angeles, returning to Akron, to head aeronautical manufacturing operations during World War II. He became general manager of tire merchandising in 1946.

Robert V. Yohe, the newly-named vice-president in charge of sales for the B. F. Goodrich Company Industrial Products Division, joined Goodrich in 1931 as a research chemist. He was named manager of the company's general chemical laboratories in 1936. In 1939, he became technical superintendent of the company's Sundries, Sponge Rubber and Latex Products Division. He was assistant director of the firm's synthetic rubber research program in 1942, and technical superintendent of the B. F. Goodrich Chemical Division until assuming the managership of a synthetic rubber plant in Louisville, Ky., built for the government by the company during World War II. He was made president of American Anode, a division of B. F. Goodrich, in 1946. He is a graduate of Drake University and the University of Minnesota.

Rollin D. Hager, newly-named vice-president in charge of manufacturing for the B. F. Goodrich Company Industrial Products Division, is a graduate of Penn State. With the company since 1925, he was made production superintendent of the company's Cadillac, Mich., plant in 1937. He was production superintendent, assistant general manager and later manager of the Lone Star Ordnance Plant. In 1943, Mr. Hager became production superintendent of industrial products manufacturing in Akron, and general superintendent in 1945. He was named general manager of all industrial products manufacturing in October, 1952.

International Rubber Diploma

At a meeting of the International Education Committee just concluded in Paris, far-reaching proposals concerning the establishment of an International Diploma for Rubber Technicians were agreed upon. Preliminary negotiations had already led to an agreement on the principle of equal technical levels of education in all collaborating countries of a standard comparable to the Licentiatship of the Institution of the Rubber Industry in London. It has now been decided that a mutually-recognized international diploma, to be awarded on passing the examination set and assessed by IRI, shall be available to candidates in participating countries. General agreement has been reached regarding requirements in preliminary and professional education and the plan will go into operation in Norway, Sweden, Denmark, Holland, France, Belgium, Western Germany, Switzerland, Italy and the United Kingdom. This is believed to be the first instance of a British professional examination being accepted as the basis for an international diploma award.

INTERNATIONAL MEETING ON TC RUBBER HELD IN DELFT ON JUNE 8

Shown above are delegates to the June 8th conference on technically classified rubber in Delft. (Left to Right): de Padirac (France); Newton (England); le Bras (France); Houwink (Netherlands); Arentzen (Indonesia); Hublin (France); van Amerongen (Netherlands); Men and Best (Malaya); Thirion (France); Fletcher (England); Wren (Malaya); and Justesen (Netherlands).

Experts from Indonesia, Malaya, France, England and the Netherlands met on June 8 in the headquarters of Rubber-Stichting in Delft, Holland, to discuss the progress made on the technical classification of rubber. It was reported that during 1952, Malaya and Indochina exported 25,000 tons of technically classified rubber. In Indonesia, steps have been taken for the production of the classified rubber. As a result of the discussions at Delft, the delegates came to a full agreement on improvements in testing methods on technically classified rubber.

Electronic Process Control Unit

Manning, Maxwell & Moore, Inc., Stratford, Conn., has introduced the "American Process Control System," a complete electronic system that is said to utilize all the advantages and superiorities of electric and electronic transmission of measurement and operational signals. The company claims the system to be the most efficient means ever developed for measuring and controlling temperature, pressure, differential pressure, liquid level and flow. There is no "lag" in the transmission signal and all controllers can be installed in the control room regardless of the distance from the process area. Stability of the system is so high that narrower proportional bands can be used with sensitivity impossible to duplicate in any other type of actuation, the company states.

Cadwell Addresses Thiokol Club

Dr. Sidney M. Cadwell, director of research and development of the U. S. Rubber Co., was the principal speaker at the meeting of the Thiokol Technical Club held in Trenton, N. J., on June 10. Dr. Cadwell spoke on "The Future Role of the Rubber Chemist," along the lines of similar talks he has been giving lately before various technical organizations as reported in previous issues. For the first time, the meeting was conducted completely outdoors on the grounds of the Thiokol Corporation plant, which was hailed as a welcome change from the usual indoor meetings.

Deecy U.V. Bleed Test

Deecy Products Co., Cambridge, Mass., has issued a report on the Deecy U. V. Bleed Test which has been in use in company laboratories for the past seven years. The test shows only the compatibility of materials in a polyvinyl chloride compound. Deecy Products states that experience has shown very good correlation between results in this test and those experienced in actual use. The company has issued the report because it has found a great many people are interested, and a considerable number have built units of their own design. The company believes the test is extremely valuable as both a research tool and as a measure of compatibility in commercial products. Copies of the test procedure are available from the company on request.

Improvement of Rayon Tire Cord

American Enka Corp. has announced that its Research Department has developed a device which it believes will make an important contribution to the improvement of rayon tire cord. This device can be used in normal cord twisting operations, the company states. Tests have indicated substantial improvement in strength, better uniformity and generally superior cord properties. This development, the company stated, is in line with American Enka's policy of furthering the usefulness of high tenacity rayon yarn in tires and other industrial applications.

WILSON TESTIFIES AT DUPONT ANTI-TRUST TRIAL IN CHICAGO

Defense Secretary Charles E. Wilson testified on June 11 in Federal District Court in Chicago, Ill., that no one ever tried to influence him to favor the U. S. Rubber Co. while he was directing tire purchases for the General Motors Corp. Mr. Wilson, who resigned as president of General Motors in January to accept his Cabinet appointment, appeared as a key defense witness in the government's civil anti-trust suit against E. I. du Pont de Nemours & Co. The government contends that DuPont and some individual members of the du Pont family dictated policies of General Motors and U. S. Rubber because of huge stock holdings in both concerns. The government is trying to force DuPont to divorce itself from the two companies.

Mr. Wilson said that General Motors reached an agreement in the early 1930's for U. S. Rubber to supply half of the automobile company's tire requirements. This came about only after General Motors had first tried unsuccessfully to make a similar agreement with Goodyear and Goodrich. Mr. Wilson was head of General Motor's central purchasing office at that time. He said on cross-examination that he had never talked in 1929 to Irenee du Pont or the late Lammot du Pont about U. S. Rubber's Tire Department. He said that he didn't know the views of these two men concerning U. S. Rubber.

The government previously introduced a letter to F. B. Davis, Jr., then president of U. S. Rubber, from Irenee du Pont advocating that the rubber company get out of the tire business. The letter contended that the automobile manufacturers might set up their own tire companies and leave independent rubber companies in a precarious position. Mr. Wilson said under direct examination that General Motors investigated the possibilities of going into the tire-making business at the start of the depression, but decided against it. Instead, the company bought $20,000,000 worth of such raw products as rubber, cotton, lead and zinc in excess of its needs.

The company then decided to purchase half of its tire requirements through the central purchasing office and the remainder through its purchasing divisions. It sought an arrangement whereby General Motors would supply the rubber and cotton and the supplier would fabricate these materials into tires and receive a certain profit.

Goodyear and Goodrich rejected the idea, and General Motors decided not to approach Firestone, which was regarded as a Ford supplier. A contract was signed in January, 1931, with U. S. Rubber under that arrangement to supply half of General Motors' tire requirements. The General Motors' divisions were free to make their tire purchases wherever they wished and General Motors never at any time bought more than 55% of its over-all requirements from U. S. Rubber, Mr. Wilson testified.

A second similar contract was negotiated with U. S. Rubber in 1932 and General Motors obtained a license to make tires under U. S. Rubber contracts. However, the license was never used. A third contract was signed in 1933 and a fourth in 1936, when some of the business was given to Firestone.

The government ended its rebuttal testimony in its suit on June 26, and the case was about ready for the summer recess. Final arguments are expected to begin in October.

Establishes New Trade Mark

As this issue went to press, Bakelite Co., a division of the Union Carbide & Carbon Corp., announced that effective immediately it was changing from the trade mark "Vinylite" to "Krene" on certain products. The name "Krene" will be used on all calendered plasticized polyvinyl chloride film and sheeting manufactured by the company. The new trade mark, it was stated, is aimed at avoiding confusion resulting from numerous adaptations of the word "vinyl". Bakelite produces film and sheeting but does not make finished products. The new trade mark will be used by fabricators for products made from "Krene".

HUMPHREYS FORECASTS RECORD RUBBER PRODUCTION IN 1953

H. E. Humphreys, Jr., chairman of the board and president of the U. S. Rubber Co., recently predicted that the rubber industry will set a new production record in the first six months of 1953. Mr. Humphreys said that as of June 30, the industry will have converted more than 730,000 tons of rubber into finished products. This will be 17% more than was consumed in the like period last year, and 11% more than the previous record half-year, the last half of 1950.

Mr. Humphreys estimated that rubber consumption for the whole year would reach 1,400,000 tons, 11% above 1952, which was the previous high year. Stating that his company's estimates of 1953 tire production "become more optimistic as the year advances," Mr. Humphreys said the industry will turn out 96,000,000 passenger car and truck tires before the year end. "If we add airplane, farm and industrial tires, we get a total of 102,000,000, which is 7.5% more than in 1952 and surpasses by 1,000,000 the all-time record set in 1947," he said.

He also noted that the rapidly increasing use of liquid latex in the industry's products is continuing in 1953. He estimated that latex consumption would reach 120,000 tons this year, compared with 105,000 in 1952 and 42,000 in the first post-war year of 1946.

The Electrical Wire and Cable Department of U. S. Rubber has made available a new 76-page booklet entitled "U. S. Electrical Wires and Cables for the Chemical and Petroleum Industries."

INTERNATIONAL SYMPOSIUM PLANS COMPLETED BY RUBBER-STICHTING

Rubber-Stichting, Delft, Holland, has announced that the list of contributions to the International Symposium on "Progress in Rubber Technology", which will take place in Delft on October 7 and 8, 1953, is now complete. France will be represented by one paper as will the United States. Western Germany will be represented by three papers, while the Netherlands will be represented by seven. A representative from Indonesia will also present a paper. Titles of the papers, their authors and connections, follow:

"Reinforcement by Resins" by G. Giger (Institut Francais du Cautchouc).

"The Mechanism of the Reinforcement of Rubber Compounds" by F. Endter (Degussa A.G.).

"The Structure and the Properties of Rubber Vulcanizates with Inorganic Fillers" by H. Westlinning (Degussa A. G.).

"Carbon Black Masterbatches from Hevea Latex" by H. C. J. de Decker (on behalf of INIRO).

"Developments of Flooring Materials" by P. Braber (Rubber-Stichting).

"New Developments in Latex Technology" by P. Braber (Rubber-Stichting).

"Rubber Derivatives — Production and Properties" by H. C. J. de Decker (Rubber-Stichting).

"Technological Considerations in the Manufacture of Latex Foam Rubber" by G. W. van Raamsdonk (Rubber-Stichting).

"The Interpretation of Mechanical Measurements by Means of the Theory of Relaxation" by G. Salomon (Rubber-Stichting).

"The Crystallization of Rubber and its Derivatives" by G. Schurr (Rubber-Stichting).

"Latex Fillers" by A. J. de Vries (Rubber-Stichting).

"Reinforcement by Black Pigments" by E. M. Dannenberg (Godfrey L. Cabot).

In addition, W. Scheele, a representative from West Germany will present a paper the title of which has not as yet been announced.

Most of the papers will be read in the German language. Discussions, however, will be held in German, English, French and Dutch, with Rubber-Stichting providing the necessary interpreters. A special program for the ladies is also in preparation. In general, no special invitations will be issued for the conference. Interested parties are advised to write Rubber-Stichting, Postbox 66, Delft, Holland, since only 150 persons can attend.

The "Inventors Day" will be held on October 9, immediately following the conference. Further announcements on this event will follow at a future date.

Silastic Properties Chart

Dow Corning Corp., Midland, Mich., has made available a chart listing the properties of typical Silastic stocks. Arranged in slide rule form, the item answers typical questions which are likely to be asked about properties of the Silastics. Copies of the chart are available from the company on request.

TIRE TESTING WASTE CHARGES DEFLATED BY OFFICIAL FACTS

According to recent newspaper reports, Army Ordnance and Reconstruction Finance Corporation officials have bashfully riddled full of holes a Congressional report charging "perfectly senseless waste" in government tire testing. They are bashful about pointing out obvious errors of fact in the report because their chiefs refuse to allow them to answer back to a Congressional committee while appropriations are under study.

RFC Administrator Kenton Cravens categorically refused to answer the charges and so did Army Ordnance spokesmen, although a book-length rebuttal had been prepared by a Pentagon investigating team. Answers have been obtained, however, to most charges leveled against the program by Representative William E. Hess (Rep., Ohio), and his Defense Activities Subcommittee of the House Armed Services Committee.

Mr. Hess branded the RFC and Ordnance program for testing tires at Camp Bullis, Texas, "a wanton waste and a profligacy which brings down upon government the just scorn and condemnation of the taxpayer." The subcommittee report recommended removing from the fiscal 1954 budget the complete allowance for Camp Bullis tire testing.

The subcommittee report charged that military vehicles are tested 3,000 miles away from the testing of the tires on which they operate. The answer in this case is that vehicles used at Bullis are tested at the same time as the tires. Other vehicles are tested at the Aberdeen Proving Grounds, Alaska and in the Arizona desert. The only cross-country mileage tests on tires are at Bullis.

The subcommittee also charged that it is inconceivable that there would or could be a military requirement calling for more rigid testing than tires used in the construction industry. This was answered by the fact that military tires must be constructed to operate over all kinds of terrain and in all kinds of weather all over the world. Construction industry tires are usually subjected to one set of predictable conditions and to relatively slower speeds, it was added.

Charges Duplication of Effort

Mr. Hess charged that it is apparent to the subcommittee that the operations at Camp Bullis are completely duplicated by industry. Here, the answer was that the cross-country tests at Bullis are not duplicated by industry's highway tests. Also, some of the Bullis tests have the goal of finding the maximum amount of synthetic rubber usable in tires. In 1949, Ordnance was directed to design tires with a maximum synthetic rubber content in order to minimize this country's dependence on natural rubber in time of war. The order was given by the Department of Defense, RFC and the Munitions Board.

A Pentagon spokesman said that "private industry had no interest in 1949 in continuing the development and manufacture of tires with synthetic content because natural rubber which is more easily worked had become available in sufficient quantities after the close of World War II and because it has certain inherent advantages."

Mr. Hess had stated that presumably the justification for the testing at Camp Bullis was to aid and assist in the integration of synthetic rubber in tire production. That experimental stage has long since been passed, he stated. This was answered in this way: The tests were to prove out tires using no natural rubber. Successful tests include cold rubber and oil-extended rubber. The experiment will not be complete as long as some truck tires cannot be successfully made from 100% synthetic.

It was also charged that Bullis uses 284 employees to do the same kind of a job that the largest tire manufacturer in the world does with 99 employees. The answer explained that the Bullis operation has two phases. One covers experiments to achieve independence of natural rubber, and the other covers performance tests on tires purchased by Ordnance. Bullis requires more drivers because it tests more types of tires and runs them around the clock to duplicate military conditions. More drivers and more vehicles mean more supervisors and maintenance men.

Two operations also mean more personnel. Clerical employees are included. Defendants of Bullis wonder if the figures the committee gave for industry include clerks in company home offices handling test data.

Mr. Hess' subcommittee condemned the proposal to increase military contributions for the tire tests to $600,000 in 1954 as compared with $486,000 in fiscal 1953. Ordnance, however, anticipates that RFC will abandon tire testing when the entire synthetic program is disposed of. Then, Ordnance will have to supply the full cost of operating the tests at Camp Bullis. RFC now supplies all personnel except for three men.

The subcommittee stated that tests at Bullis are of limited advantage, are a complete duplication, and can be achieved much more efficiently and with less expense by more direct methods (i.e., by private industry). The Pentagon spokesman answered this charge by saying that "a single, government-controlled tire testing center is required in order that tire testing may be economical, effective and impartial."

Also, the RFC part in the Bullis tire testing operations has been subject to regular review by representatives of the tire industry on the RFC rubber industry advisory board. The RFC total budget for rubber research is slightly over $6,000,000. An industry witness at Congressional rubber hearings recently estimated private enterprise would spend about $15,000,000 in view of RFC's $500,000,000 a year gross sales of synthetic rubber.

PROMOTION OF BLOUNT AND INTEMANN ANNOUNCED BY BAKELITE CO.

C. W. Blount

H. K. Intemann

Bakelite Co., a division of the Union Carbide and Carbon Corp., has announced that C. W. Blount has been appointed vice-president in charge of sales, and H. K. Intemann has been named vice-president and general sales manager for the company. Mr. Blount succeeds George C. Miller, who was recently named president of the concern. In his new position, Mr. Intemann succeeds Mr. Blount. A graduate of the U. S. Naval Academy, Mr. Blount joined the Bakelite organization in 1924. Mr. Intemann joined the company in 1930 following his graduation from the Stevens Institute of Technology, Hoboken, N. J.

U. S. Rubber Promotes Tipton

Warren A. Tipton has been appointed general sales manager of the Mechanical Goods Division, U. S. Rubber Co., succeeding Walter F. Spoerl, who recently retired after 45 years with the company. A graduate mechanical engineer from the University of Illinois, Mr. Tipton joined U. S. Rubber as a salesman in its Houston, Texas, branch in 1935. In 1937, he was named product manager for industrial packings and expansion joints. In 1942, he was appointed district sales manager for the division's New York branch and in 1949 was named manager of all branch sales with headquarters in New York. Mr. Tipton became sales manager of the Mechanical Goods Division in 1952, a position he held until his most recent promotion.

PLANS FORMULATED FOR THE 1954 RUBBER TECHNOLOGY CONFERENCE

The Institution of the Rubber Industry plans to hold its Third Rubber Technology Conference in London from June 22 through 25, 1954, and a committee has been set up to arrange the program for this meeting. At previous conferences it was necessary to hold simultaneous meetings in order to allow all the papers to be presented in the time available. IRI considers this practice to be undesirable, and the new conference will allow four days for the presentation of papers. The number of papers will also be limited which will also permit a more coherent discussion program to be planned.

The committee has already given preliminary consideration to the scope of the conference and suggests that the emphasis should be placed on topics in which there have been important recent advances and that the main sections should include the following: (1) Production and Analysis of Natural Rubber; (2) Production and Evaluation of Synthetic Rubbers; (3) Production and Evaluation of Plastics of Interest to the Rubber Industry.

Also, (4) Natural and Synthetic Latices; (5) Physics of Rubber; (6) Chemistry of Rubber; (7) Compounding Ingredients; (8) Fibers and Textiles in the Rubber Industry; and (9) Factory Techniques and Products.

In order to facilitate the compilation of a program, IRI has adopted this procedure. Those desiring to present a paper at the conference should submit a 300 word summary to IRI at 12 Whitehall, London S. W. 1., by October 1, 1953. On the basis of the summaries received, the committee will select sufficient papers to make up a good program. Authors whose summaries are selected will then be invited to submit full papers. These will be required by February 1, 1954. Preprints will be circulated in advance of the conference so as to enable the maximum time to be devoted to discussion. IRI reserves the right to publish such papers as they think fit in the Conference Report.

Fines End Roller Trust Suits

The National Association of Printers Roller Manufacturers, Inc., six corporate manufacturer members and five individuals were recently fined a total of $15,500 in Federal District Court in New York City, ending the government's criminal and civil anti-trust actions involving the manufacture and sale of rollers used in printing presses. The civil case was terminated by the entry of a consent judgement. The criminal case ended when all the defendants except one entered pleas of no-contest and the court imposed the fines. On government motion, Robert Arbuckle, president of Wild & Stevens, Inc., of Boston, Mass., was dismissed as a defendant in the criminal case. The government had charged the defendants with having agreed to maintain identical list prices to be charged for printers' rollers having metal cores with a glue-glycerine compound, and to adhere to uniform discounts from list prices granted in the eastern part of the United States.

Coming Events in the Rubber Industry

Aug. 4. New York Rubber Group, Golf Tournament.

Aug. 21. Philadelphia Rubber Group, Cedarbrook Country Club, Philadelphia, Penna.

Sept. 9-11. Rubber Division, A.C.S., Fall Meeting, Hotel Sherman, Chicago, Ill.

Sept. 12. Connecticut Rubber Group, Summer Outing, Paterson Club, Fairfield, Conn.

Sept. 17. So. Ohio Rubber Group, Engineers' Club, Dayton, Ohio.

Sept. 19. No. California Rubber Group, Summer Outing, Adobe Creek Lodge, Los Altos, Calif.

Oct. 1. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Oct. 2. Detroit Rubber and Plastics Group, Fall Meeting, Detroit-Leland Hotel, Detroit, Mich.

Oct. 6. Buffalo Rubber Group, Hotel Westbrook, Buffalo, N. Y.

Oct. 6. Los Angeles Rubber Group, Hotel Statler, Los Angeles, Calif.

Oct. 16. Boston Rubber Group, Fall Meeting, Hotel Somerset, Boston, Mass.

Oct. 16. New York Rubber Group, Fall Meeting, Henry Hudson Hotel, New York, N. Y.

Oct. 23. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Nov. 6. Chicago Rubber Group, Fall Meeting, Furniture Mart, Chicago, Ill.

Nov. 10. Los Angeles Rubber Group, Hotel Statler, Los Angeles, Calif.

Nov. 13. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Nov. 29-Dec. 4. A. S. M. E. Annual Meeting, Hotels McAlpin and Statler, New York, N. Y.

Dec. 3. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Dec. 3-4. Society of the Plastics Industry, Fifth Film, Sheeting and Coated Fabrics Division Conference, Commodore Hotel, New York, N. Y.

Dec. 11 Boston Rubber Group, Xmas Party, Hotel Somerset, Boston, Mass.

Dec. 11. Detroit Rubber and Plastics Group, Xmas Party, Sheraton-Cadillac Hotel, Detroit, Mich.

Dec. 11. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 12. So. Ohio Rubber Group, Xmas Party, Miami Valley Country Club, Dayton, Ohio.

Dec. 15. Buffalo Rubber Group, Xmas Party.

Dec. 18. Chicago Rubber Group, Xmas Party, Morrison Hotel, Chicago, Ill.

Jan. 24, 1954. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Jan. 29, 1954. Akron Rubber Group, Winter Meeting, Mayflower Hotel, Akron, Ohio.

Feb. 5, 1954. Chicago Rubber Group, Congress Hotel, Chicago, Ill.

Feb. 11, 1954. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Mar. 26, 1954. Akron Rubber Group, Spring Meeting, Mayflower Hotel, Akron, Ohio.

Mar. 26, 1954. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Apr. 8, 1954. Fort Wayne Rubber & Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Apr. 14-16, 1954. Rubber Division, A.C.S., Spring Meeting, Hotel Brown, Louisville, Ky.

Apr. 30, 1954. Chicago Rubber Group, Furniture Mart, Chicago, Ill.

Sept. 15-17, 1954. Rubber Division, A.C.S., Fall Meeting, Hotel Commodore, New York, N. Y.

Butyrolactone, the inner ester of gamma-hydroxybutryric acid, is now available in tank car quantities from the General Aniline and Film Corp.

Ingersoll-Rand Co., New York, N. Y., has just made available its Bulletin 7277, which describes the company's "AFL" line of process pumps.

SPI-SPE-SAE JOINT MEETING HEARS ADDRESS BY CRAWFORD

The joint meeting held by the west coast section of the Society of the Plastics Industry, the Society of Plastics Engineers and the Society of Automotive Engineers on June 4 in Berkeley, Calif., heard an interesting address on reinforced plastics by M. B. Crawford, Jr., western plastics sales manager of the Naugatuck Chemical Division, U. S. Rubber Co. Mr. Crawford expressed the opinion that reinforced plastics are in the automotive industry to stay. Glass-plastic material, he said, has properties which make it a material the automotive industry can't ignore.

He explained that in the past 17 months, since the first announcement of the commercial production of a low-cost, reinforced plastic car body, two major auto manufacturers have announced large scale production of plastic cars and every other automotive manufacturer is taking a close look at this new material. In addition, approximately 20 small companies are manufacturing semi-custom sports car bodies from the material.

Listing the properties of reinforced plastic, Mr. Crawford said it was strong, dentproof, rust-proof, light in weight, dimensionally stable under wet or dry conditions, easily fabricated in inexpensive molds without pressure and at room temperatures, and adaptable to free-flowing designs. However he stressed the need for improved production techniques for reinforced plastics to adapt them to the mass-production methods of the automotive industry.

He explained that methods currently in use were satisfactory for the production of up to 15,000 units of a single body design. At that point, he said, costs compare favorably with the cost of producing a similar number of units in metal. Beyond that figure metal construction costs decline, he added, while plastic production costs remain at about the same level.

"There is also a need for a fresh approach to design since one of the major features of reinforced plastics is that they lend themselves to greater freedom of design," Mr. Crawford said. He predicted that in the "not-too-distant future" reinforced plastics would make it possible to offer the American public "hundreds and hundreds of body styles instead of a dozen or two" for cars being produced by the country's major manufacturers.

Microloc Company Formed

Stillman Rubber Co., Culver City, Calif., and John F. Drescher, one of America's foremost aircraft armament engineers, have joined resources to form Microloc, a new venture for research, design and development of electro-mechanical specialties and armament equipment for use in aircraft and guided missiles. Mr. Drescher has been appointed chief engineer of the new company and Walter Fleming has been named general manager. Officials of Stillman Rubber and Mr. Drescher said the new venture was fully staffed and has been working on a number of projects of a secret nature whose details could not be disclosed.

U.S. RUBBER ANNOUNCES PROMOTION OF NOONAN AND LUXENBERGER

C. J. Noonan

E. A. Luxenberger

Chester J. Noonan has been appointed vice-president and general manager of the Footwear and General Products Division of the U. S. Rubber Co., succeeding Walter H. Norton, who retired on June 30. Eugene A. Luxenberger, formerly assistant production manager of the division, has succeeded Mr. Noonan as assistant general manager of the division. Mr. Noonan started his career with U. S. Rubber in 1919 as a clerk in Great Falls, Montana. He was appointed footwear sales manager in Salt Lake City in 1922 and in Los Angeles in 1929. He was Pacific Coast sales manager from 1933 to 1938 when he was made manager of clothing and coated fabric sales. Mr. Noonan was appointed general sales manager in 1943 and assistant general manager of the division in 1950.

Mr. Luxenberger started with the company as a production worker at the Williamsport plant 32 years ago. He was transferred to the Mishawaka, Ind., plant as manager of industrial engineering in 1932. Successive promotions brought him appointment as factory manager in 1943. Since 1951, he has served as assistant production manager, responsible for manufacturing activities in the division's plants in Mishawaka and Washington, Ind., Milan, Tenn., Chicago, Ill., and Stoughton, Wisc.

Mr. Norton was associated with U. S. Rubber for nearly 42 years. He started as a stock clerk in Boston. In 1915, he joined the Cost Department of the Naugatuck, Conn., footwear plant. Following a series of positions in production supervision, he became production superintendent of the plant in 1919. In 1921, Mr. Norton was appointed factory manager of the Williamsport plant and of the Naugatuck footwear plant in 1928. In 1941, be cecame production manager of the Footwear Division and in 1943, assistant general manager. He had been vice-president and general manager of the Footwear and General Products Division since 1950.

Neoprene Gasketing Material

Vulcanized Rubber & Plastics Co. of Morrisville, Penna., is producing a new, highly conductive gasketing material made of aluminum wire screening whose interstices are filled with neoprene. Both surfaces of the material are buffed to insure uniform gage and smoothness, and to expose the aluminum wire so that it will make good contact with the flanges. The new gasketing is intended primarily for mounting electrical equipment in automobiles and aircraft, and for general use in radio, TV and other electronic equipment. The good electrical conductivity of the aluminum wire permits static electricity to drain through the gasket. In addition to its conductivity, the material is said to have two important advantages — dimensional stability and resistance to deterioration. The material can be supplied either in the form of cut gaskets or uncut sheets 19 inches long and 15 inches wide. Thickness as now supplied is 0.02 inches, other thicknesses can be made if there is a demand for them.

Passenger Conveyor Model Shown

A working model of the design for what is said to be the world's first passenger conveyor system was recently shown in New York City to more than 600 city and state officials, businessmen and transportation experts. The 15-foot model is a scale replica of the new passenger conveyor belt subway shuttle which has been proposed for New York City by the Goodyear Tire & Rubber Co. and Stephens-Adamson Manufacturing Co. The model depicts the actual operation of the proposed passenger conveyor system with moving loading and unloading platforms, deceleration and acceleration systems, main line belts, turnarounds and "astradome" cars. Goodyear engineers, in cooperation with engineers of Stephens-Adamson, designed a "continuous flow transit system" using moving loading and unloading platforms and small, closely-spaced passenger cars riding on an endless track of rubber conveyor belts and pneumatic-tired banks of powered wheels for speeding up and slowing down the cars.

RUBBER GROUPS ABOUT THE COUNTRY HOLD INTERESTING SUMMER OUTINGS

With the coming of the summer months many of the rubber groups about the country forego their usual technical meetings to hold picnics, golf tournaments and outings. These annual affairs usually feature different athletic contests, while those less athletically inclined play cards, snooze under a shady tree, or just sit and talk with the boys. Reports on the activities of some of these groups at their annual outings follow:

BOSTON RUBBER GROUP

Well over 500 members and guests attended the annual outing held by the Boston Rubber Group on June 19 at the Andover Country Club, Andover, Mass. J. E. Williamson served as chairman of the Outing Committee which included Arthur I. Ross and Harry Atwater. L. Longworth served as director of the golf tournament while E. F. Freeman directed the softball game. The putting contest was under the direction of W. Walker and N. W. Herthel headed the darts contest. The horseshoes game was directed by J. Cullen. C. Meyer headed the horse racing game and the tub and ball game was directed by D. Kirkpatrick. Dinner was served in the evening at which time prize awards were made to the contest winners.

NEW YORK RUBBER GROUP

The annual outing of the New York Rubber Group was held at Sundance Lodge in Caldwell Township, N. J., on Thursday, June 11. Approximately 165 members and guests were present at the outing, marked by the first clear, sunshiny day in several years. An innovation at this year's outing was the elimination of a wind-up dinner, food being served all day long at the inclination of those present. G. W. McComb (Rubber Corp. of America) was general chairman of the outing, assisted by Bob Carroll, Bob Toth, Bill Lamella, Tom Loser, R. H. Barton, T. F. Callahan, M. Doane and A. W. Woodward. Prizewinners of the various events included the following: *Baseball Throw,* Len Komar (Titanium Pigment); *Bocci,* George McNamarra (Pequanoc Rubber) and George Jatinen (Sid Pike); *Darts,* Henry Peters (Bell Telephone Labs.); *Golf-Driving,* E. T. McBride (Burgess Pigment); *Horseshoes,* Bill Lamella (Okonite), first, and M. R. Buffington (Lea Fabrics), second. Other events included a softball game between the "peddlers" and the "chemists."

QUEBEC RUBBER AND PLASTICS GROUP

The annual golf tournament of the Quebec Rubber and Plastics Group was held on June 19 at the Granby Golf Club in Granby. About ninety-five golfers participated in the tournament. Following the tournament, approximately 120 members and guests attended a dinner at the Windsor Hotel in Granby, after which prizes were awarded to the winners of the different golfing events. Winners of the events follow: *1st Low Gross,* Murray Hayes; *2nd Low Gross,* N. B. Roberts (Polymer); *3rd Low Gross,* C. P. Dearth (Bolta Plastics); *Most Honest Golfer,* Wilfred Grignon (Dominion Rubber); *Loser of Most Golf Balls,* Harry Kushnarof; *Best Looking Sitting Bull,* John Ramsay (Miner Rubber).

The tournament and dinner were organized by Ed May (Naugatuck Chemical). Dick Harrowing handled the prize awards while Harold Loiselle took charge of score computing. Bill Blundell and Bill Halsall were score-keepers.

RHODE ISLAND RUBBER CLUB

The annual summer outing of the Rhode Island Rubber Club was held on June 4 at the Metacomet Golf Club in East Providence, R. I. Approximately 210 members and guests attended, setting a record high attendance. The following members won the various events featured in the golf tournament: *Low Gross,* William A. MacGuire (United Carbon), Arthur W. LaCouture (Ansbacher-Siegle), and L. E. Crossley; *Low Net,* E. L. Parent (Best Thread), Frank Ataman (Firestone Industrial Products), and Patrick A. Uva (Avon Sole).

Kicker's Handicap, Thomas J. Conlon (Dow Chemical), C. C. Hronek (U. S. Rubber), and Thomas Jay (Gulf Oil); *Putting Contest,* Miles Powell, Jr. (DuPont), C. A. Damicone (Acushnet Process), and Vincent A. Rego (Narragansett Wire); *Nearest to Pin—5th Hole,* J. Morehead (Spencer Thermostat); *Nearest to Pin—7th Hole,* J. Davies (Arnold Hoffman); *Nearest to Pin—10th Hole,* J. Elwood Hart (Taylor Instrument); *Most 6's,* H. Logan Lawrence (DuPont); *Most 7's,* John M. O'Grady (Respro); *Most 8's,* Alan Bryant (Binney & Smith); *High Gross,* Herman Gadon (Crescent); *High Net,* Joseph R. Powell (D. H. Litter); *Longest Drive,* Allen Midyette (C. F. Church).

SOUTHERN OHIO RUBBER GROUP

On June 6th, the Southern Ohio Rubber Group held its annual outing at the Inland Activities Center in Dayton, Ohio, with approximately 110 members and their guests in attendance. The golf tournament was held at Madden Park in Dayton. In the golf tournament, R. E. Antheil (Inland Mfg.) won first place in the blind bogey. Second place in the same event went to Ray Ritzert (Dayton Rubber), Cletus Norman (Inland Mfg.), Max Baker (Inland Mfg.), Courtney Zimmerman, and Jim Wall (Inland Mfg.). Third place in the same event went to Bob Sucher (Marbon), Lloyd Wendall (Inland Mfg.), and Jack Feldman (Inland Mfg.).

The low gross event was won by Bob Sucher and Frank Woznak (Irvington Varnish). Low Net was won by Frank Hovey (Inland Mfg.) and Floyd Puterbaugh (Dayton Rubber). Mark Deal (Inland Mfg.) took the high gross event. There were no prizes for games played at the picnic. All prizes were placed in a grab bag and names called according to numbers.

WASHINGTON RUBBER GROUP

The annual outing of the Washington Rubber Group was held on June 5 at the Annapolis Roads Club. J. J. Sears (RMA) was chairman of the outing committee, assisted by C. C. Miller (RMA). P. S. Greer (Synthetic Rubber Division) served as chairman of the Ticket Committee. Other members of this committee included A. S. Anisman (Synthetic Rubber Division), D. K. Bonn (U. S. Rubber), Norman Bekkedahl (Bureau of Standards), R. E. Harmon (Connecticut Hard Rubber), Ethel Levene (Bureau of Ships), J. C. Montermoso (Office of Quartermaster General), and R. D. Stiehler (Bureau of Standards).

The Prize Committee was headed by G. M. Riveire (Goodyear), while T. R. Scanlan (Gates Rubber) was chairman of the Special Events Committee. C. D. Kothe (Potomac Rubber), G. E. Meyer (Goodyear), Dorothy Riebel (NPA), and R. H. Williams (Goodyear) all served on the Special Events Committee. J. T. Cox, Jr., was chairman of the Dinner Committee.

The following participants were winners of the various men's golf events: *Low Net,* Leland E. Spencer; *Low Net Runner-Up,* Mark R. Barlow; *Low Gross,* Harry D. Brown; *Low Gross Runner-Up,* R. E. Vernor; *High Gross,* T. R. Scanlan; *Low Gross,* Nels Kruger; *Putting Contest,* R. J. Devereaux; *Driving Contest,* Nels Kruger; *Hole-in-One Contest,* James Rice; and *Most Sixes,* Irving Kolman.

The ladies' golf events were won by the following: *Low Net,* Mrs. L. P. Best; *Low Gross,* Mrs. Jack Smith; *Low Gross Runners-Up,* Mrs. Fred Chaimson and Mrs. A. L. Lewis; *High Gross,* Dorothy Riebel.

A special event for Luck Accurate Score was won by R. J. Devereaux, Frank R. Mathews and Mrs. L. E. Spencer.

The horseshoes tournament was won by E. G. Holt with H. W. Julian as runner-up. The men's ping-pong tournament was won by R. J. Devereaux with H. W. Julian as runner-up. The women's ping-pong tournament was won by Mrs. H. W. Julian with Ethel Levene as runner-up.

First prize in the bridge tournament went to Mrs. B. F. Grimm. Mrs. C. C. Miller won second prize, while the "booby" prize went to Norman Bekkedahl.

A number of prizes were awarded in a special events category. Mrs. H. W. Browning won for the largest family attending. Mrs. R. N. Vernor won a special prize for runner-up in high gross at the ladies' golf tournament, and Beatrice Fuller won a prize as the most distant visitor.

New Masland Duraleather Plant

Masland Duraleather Co., Philadelphia, Penna., has announced plans to construct a new $450,000 plant in the northeastern section of Philadelphia. About one-third of the one-story, 100,000 square foot unit will be devoted to printing and embossing of "Duran," the company's plastic upholstery material. The remainder will be used for warehousing, shipping and office space. Masland bought the three acre site last January for $125,000.

Goodwin Elected Vice-President

K. P. Goodwin

Acushnet Process Co. of New Bedford, Mass., has announced the election of Karl P. Goodwin as second vice-president and director of sales of the Rubber Division. A graduate of the Massachusetts Institute of Technology, Mr. Goodwin was associated with the Remington Arms Co. prior to joining Acushnet Process as a draftsman in the Engineering Department in 1938. Advanced to the position of assistant to the chief engineer, he later became assistant factory manager. He represented the company as a sales engineer in the field for two years and then was named sales manager of the Rubber Division, a position he held for the past eight years. Mr. Goodwin recently completed the Harvard Advanced Management Program.

Building Fatty Alcohol Plant

Archer-Daniels-Midland Co., Minneapolis, Minn., is constructing a new plant at Ashtabula, Ohio, for the production of unsaturated and saturated alcohols. Vegetable, animal and marine fats and oils will serve as the principal raw materials. Ground for the new plant was broken in June, with production scheduled to begin in June, 1954. While alcohols will be the major products of the plant, glycerine and caustic soda will be important by-products. While the production of unsaturated higher alcohols will be a new venture for the company, the firm has been manufacturing fatty alcohols and glycerides since 1936. At the present time, the concern is making cetyl, stearyl and liquid alcohols from sperm oil at its plant located at Wyandotte, Mich.

Sponge Rubber Arch Supports

Hydraulic Arch Support Co., Kent, Ohio, has introduced a new arch support which features a fluid-filled sac as an integral part of the support. The support consists of a base of sponge rubber covered with a layer of calfskin. Between the layers is a sack filled with a newly-developed hydraulic oil. The entire support is cemented and vulcanized to make it permanently leak proof. As pressure shifts under the walking foot, the fluid shifts to support that part of the arch which is bearing the body's weight.

Naugatuck Chemical Appointments

Four new assignments in the Research and Development Department of the Naugatuck Chemical Division of the U. S. Rubber Co. were recently announced. Dr. W. F. Tuley was appointed group manager of product development and technical sales service; Dr. L. H. Howland, manager of synthetic rubber development; Dr. P. M. Elliott, manager of plastics development; and F. L. Holbrook, manager of rubber chemicals development.

Dr. Tuley, formerly technical director of rubber chemicals and synthetic rubber development, joined the company's general laboratories in 1928. Since that time, he has served in various production and sales positions. He holds several patents for accelerators and antioxidants. He was graduated from Oregon State College, and was awarded his master's and doctor's degrees by the University of Illinois.

Dr. Howland also joined the company's general laboratories in 1928, immediately after obtaining his doctor's degree in chemistry from the University of Iowa. He has had several research and development assignments since that time, and was previously manager of GR-S research and development. He holds numerous patents on rubber chemicals, synthetic rubber and organic chemicals.

Dr. Elliott joined the company's general laboratories in 1937, and transferred to Naugatuck Chemical two years later. He has worked on rubber chemicals and rubber compounding, and since 1943 has been associated with plastics development. He was previously supervisor of Kralastic and Vibrin evaluation. Dr. Elliott is a graduate of the University of Maine, and obtained his doctorate from Cornell University.

Mr. Holbrook, a graduate of Worcester Polytechnic Institute, has been with the company since 1919. He joined Naugatuck Chemical in 1931 after assignments with the rubber company's footwear and plantations division. His first post in the chemical division was director of the rubber testing and evaluation laboratories, and he was previously assistant manager of rubber chemicals development and sales service.

Thermoid Promotes Brockway

Thermoid Co., Trenton, N. J., has announced that Carl P. Brockway has been elected president and director of its subsidiary, the Asbestos Manufacturing Co. of Huntington, Ind. Mr. Brockway is a vice-president of Thermoid and formerly was in charge of Friction Division manufacturing at the company's main plant in Trenton. Joining Thermoid in 1941, he took a prominent part in the company's conversion to war production during World War II and the reconversion afterward. Before joining the company, Mr. Brockway spent 16 years with the World Bestos Corp., his last position being that of president and general manager of that firm. A. E. "Ed" Runkle, associated with Thermoid for the past 20 years, has been named superintendent of the Friction Division. Mr. Runkle will take over the former duties of Mr. Brockway.

Named General Sales Manager

L. W. Jeffries

Lloyd W. Jeffries has been named general sales manager of both the Valvair Corp. and its affiliate, the Sinclair-Collins Valve Co., both located at 454 Morgan Ave., Akron, Ohio. Mr. Jeffries has had many years of experience in the air valve field, embracing management, merchandising and promotion. He succeeds Kenneth E. Knotts, who became sales representative for Valvair in metropolitan New York and northern New Jersey. The K. E. Knotts Co. maintains headquarters at 106 Miln St., Cranford 6, N. J.

Recent Sunoco Bulletins

The advantages of using Circosol-2XH and Sundex 53 to extend high Mooney viscosity GR-S polymers are discussed in a new technical bulletin recently issued by the Sun Oil Co., 1608 Walnut St., Philadelphia 3, Penna. These products have entirely different properties, the company states, and between them can satisfy the requirements of most oil-extended polymers. Another new Sunoco technical bulletin discusses the use of Sundex 53 as a plasticizer for high Mooney viscosity Neoprene WHU. This bulletin contains a very complete comparison of Sundex 53 with other petroleum base plasticizers for this application. Copies of these technical bulletins may be obtained by writing the company.

Win MCA Safety Awards

The A. R. Maas Division of the Victor Chemical Works at South Gate, Calif., and the Naugatuck Chemical Division of the U. S. Rubber Co., Naugatuck, Conn., have won the Lammot du Pont safety plaques awarded annually by the Manufacturing Chemists Association to the two chemical companies showing the greatest improvement in plant safety over a five-year period. Naugatuck Chemical was the winner among producers with more than 2,000,000 man-hours' exposure, and Maas had the best record among concerns with smaller exposure. Runners-up were, respectively, the Tar Products Division of the Koppers Co. and the Jefferson Chemical Co.

NAMES IN THE NEWS

H. L. EVANS has been elected vice-president in charge of manufacturing for the Flintkote Co., New York, N. Y.

L. S. LARSON, associated with the Standard Products Corp. since 1944, has been named controller, while CHARLES C. HAMMER, previously controller at Textron, Inc., has been named director of financial planning.

EDWIN A. TEHAN has joined C. H. Masland & Sons as general sales manager and WALTER ADEE has been named contract sales manager for the company.

FRED WEHMER, associated with the Adhesives and Coating Division of the Minnesota Mining & Manufacturing Co. for many years, has left that organization to join the Rubber and Asbestos Corp., Bloomfield, N.J., as technical sales director.

J. H. DYETT, formerly vice-president, secretary and assistant treasurer of the Rome Cable Corp., has been elected executive vice-president. G. A. WEISS, formerly assistant secretary, has been elected secretary succeeding Mr. Dyett.

C. M. DONAHUE, manager of the Mining Department and the International Division, and E. G. SANNER, manager of manufacturing, have been elected vice-presidents of the Mine Safety Appliances Co.

RONALD R. MENTI, previously supervisor of employee relations for the Textile Division of the U. S. Rubber Co., has been appointed assistant to the executive vice-president of the company.

EARL W. DIENER, formerly district sales manager for the Titanium Pigment Corp., has been appointed eastern sales manager succeeding the late JOHN A. LUTZ.

WILLIAM C. RIDGE, associated with John A. Roebling's Sons Corp. since 1942, has been appointed works manager in charge of the manufacturing operations of the Trenton and Roebling, N. J., plants, succeeding J. D. THOMPSON, who recently resigned to accept another position.

JAMES K. MACDOUGALL, formerly associated with the Harshaw Chemical Co., has been named director of industrial relations for the Seiberling Rubber Co.

SAM I. ROUDEBUSH, previously with the General Tire & Rubber Co., has been appointed assistant manager of tire design for the Seiberling Rubber Co.

G. L. SMITH, formerly sales manager for Republic Rubber, has been named general sales manager.

THOMAS J. FARLEY, until recently associated with the U. S. Rubber Reclaiming Co., has joined the Essex Rubber Co., Trenton, N. J., as chief chemist.

R. S. LOVELESS, formerly associated with the Castle Rubber Co., has been named technical director for the Neff-Perkins Co., Cleveland, Ohio.

ALFRED G. COBBE has joined the staff of the Research and Development Department of the Cabot Carbon Co., Pampa, Texas.

JONATHAN N. HARRIS, controller of the Dewey & Almy Chemical Co. since 1931, has been named consultant to the treasurer. Waldo W. Neikirk, formerly assistant treasurer, has been named controller succeeding Mr. Harris.

ARTHUR M. BREWER has rejoined the engineering staff of the Automotive Rubber Co. after 27 months of military service as a jet pilot instructor.

FRED W. FRALEY, associated with the Diamond Alkali Co. since 1928, recently retired as a vice-president of the company.

WILLIAM D. ZAHRT, assistant treasurer of the Firestone Tire & Rubber Co., was recently installed as president of the Akron Rotary Club.

FRANKLIN FRENCH, associated with the Kirkhill Rubber Co. for many years as chief chemist, has joined the Goodyear Rubber Co. as superintendent of its San Francisco and San Leandro plants.

GORDON E. MEDLOCK, formerly assistant sales manager of Stearns Magnetic Inc., Milwaukee, Wisc., has been appointed sales manager of the concern.

CLARENCE W. HIGBEE, manager of the Wire and Cable Department of the Mechanical Goods Division, U. S. Rubber Co., has been given an honorary degree of civil engineer by Rensselaer Polytechnic Institute.

STANLEY F. CHOATE, formerly associated with O'Connor & Choate, Inc., has joined the Tumpeer Chemical Co. as a sales representative.

DR. HOWARD L. BENDER, assistant director of the Research and Development Department of the Bakelite Co., has received the twelfth annual John Wesley Hyatt Award for "achievement of wide importance to the plastics industry" from the Society of the Plastics Industry.

JOHN J. NEWMAN, who recently retired as a vice-president of the B. F. Goodrich Co., was guest of honor at a luncheon meeting of the Rubber Manufacturers Association held on June 30 in New York City.

W. C. T. UTLEY, previously associated with the Traffic Department of the Consolidated Vultee Aircraft Corp., has been appointed traffic manager of both the Sid Richardson Gasoline and Carbon Companies.

JAMES H. LUM, formerly manager of the Phosphate Division of the Monsanto Chemical Co., has been appointed director of development for the Organic Chemicals Division.

RICHARD A. STEENROD, associated with the General Electric Co. since 1949, has been named silicone sales representative at Cincinnati, Ohio.

JOHN R. CRAWFORD, who joined the Brown Co., Boston, Mass., in 1952, has been named midwestern representative for the Solka-Floc Sales Division.

HARRY B. MCCLURE, since 1944 a vice-president of the Carbide & Carbon Chemicals Co., has been appointed executive vice-president of the firm.

FRED M. PUGH, formerly silicone sales representative in Cincinnati, Ohio, for the Silicone Products Department of the General Electric Co., has been named sales representative for silicone products to industries in central and eastern Ohio.

JOHN B. CALKIN, chemical engineer and consultant with offices in New York City, has been named assistant to the president of Foster D. Snell, Inc.

K. A. ALLEN, associated with the Quaker Rubber Corp., a division of H. K. Porter Co., since 1949, has been appointed director of national accounts for Quaker Rubber.

J. W. LISKA has been named chairman of the Akron Polymer Lecture Group for the 1953-54 season.

JOSEPH A. CONLON, affiliated with the rubber industry since 1930, has been appointed vice-president of the New York Belting and Packing Co., to function as the company's senior operating executive. He succeeds BEN F. REUTHER, who has retired after more than 48 years in the rubber industry.

DR. E. L. STROMBERG, formerly chairman of the Department of Psychology at Western Reserve University, has joined the B. F. Goodrich Co. as manager of training and personnel research.

JOHN R. HOOVER, president of the B. F. Goodrich Chemical Co., has been elected a director of the Manufacturing Chemists' Association.

E. A. O'NEAL, JR., formerly general manager of the Overseas Division of the Monsanto Chemical Co., has been named president of the division and elected a director of the parent company. ARNOLD H. SMITH, formerly president of Monsanto Canada, Ltd., has resigned from that post to become special assistant to Mr. O'Neal.

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The automotive industry's high speed, high power era demands tougher, longer wearing tires. STATEX® 125 is solving the problem effectively.

In passenger tires, mileage gains averaging 25 per cent over HAF have led to ever widening use. In truck tires, substantially decreased flex cracking plus improved mileage have resulted in still greater use.

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NEWS IN BRIEF

Adhesive Products Corp., has announced the development of an improved hot drip strippable plastic coating for protecting tools, gears, and machine parts during processing, storage and shipping.

The "1950 Market Guide for Latin America" has just been issued by the American Foreign Credit Underwriters Corp., New York, N. Y. The 32nd revised edition, this volume lists and gives ratings for more than 100,000 individual buyers and sales representatives in all countries of Central and South America, Mexico, Cuba, Puerto Rico and the West Indies.

Emery Industries, Inc., has announced the availability of a new improved grade of pelargonic acid, "Emery 892-R," in experimental and pilot quantities.

Goodyear's Chemical Division has published a 12-page illustrated booklet of helpful hints and recommendations on painting around home and farm buildings with paints containing Pliolite S-5.

A molded reinforced plastic 17-foot outboard day cruiser, the "Sea Rambler," has been introduced by the Marine Craft Division of the Bedell Engineering Co., Port Washington, L. I., N. Y., in kit form for final assembly at home. The molded hull, deck and cabin are fabricated from glass fiber and Vibrin polyester resins.

A new casein specially developed for use as a stabilizer in latex emulsion paints has been announced by the Chemical Division of the Borden Co.

A six-page, pocket size folder entitled "Desk Calculator," available from the Pangborn Corp., Hagerstown, Md., presents in easy-to-use form formulas, constants and conversion factors useful in basic engineering, blast cleaning and dust control calculations.

Columbia-Southern Chemical Corp., has made available Pigment Data Bulletin 53-2 entitled "Hi-Sil C" which offers laboratory compounding data.

Godfrey L. Cabot, Inc., has published an illustrated map of the United States which indicates the whereabouts of all company operations.

A Technical Service Bulletin, No. G-101, on gum arabic, has just been published by Morningstar, Nicol, Inc. The two-color, four-page bulletin is designed to provide users of gum arabic with general information on the origin, physical and chemical properties and mesh specifications of this material.

General Aniline & Film Corp. has reduced its development prices on methyl vinyl ether and ethyl vinyl ether to 20 and 25c a pound, respectively.

How to get the greatest possible number of recaps out of truck tires is the subject of an eight-page booklet just published by Goodrich.

"Neoprene Latex in Paper Board" is the title of a new technical bulletin published by the Rubber Chemical Division of E. I. du Pont de Nemours & Co., Inc. Ask for PR-3.

A license to manufacture thermoplastic welting for shoe construction has been issued to the Dewey & Almy Chemical Co. by the Shoe Patents Corp.

Ground will be broken this summer for a major expansion of Shelbyville Mills, textile mill operated by U. S. Rubber at Shelbyville, Tenn. The expansion will be a one-story addition to the main mill building covering more than 67,000 square feet of floor space.

Bolted steel storage tanks used by Army Engineers are now said to be effectively sealed from leakage with new extra-soft gaskets developed by the Thermoid Corp. in cooperation with the Engineer Research and Development Laboratories.

Boston Woven Hose & Rubber Co. has announced two new additions to their standard line of "Bull Dog" all-rubber boxed tubing, a 5/16 inch I. D. by 1/16 inch wall, and a 3/8 inch I. D. by 1/16 inch wall.

A new 32-page manual on the installation and maintenance of conveyor and elevator belting has just been published by Goodrich. More than 60 photographs and drawings illustrate ways to improve belt service and to lengthen belt life.

Pee Gee Bee, Minneapolis, Minn., is producing a tough new golf tee that stands firmly on three legs. Made of Bakelite polyethylene, the tee holds the ball steady without having to push through sun-baked, frozen or muddy ground.

A pressure-sealing zipper which features a pair of rubber lips which fold over the metal teeth has found use on plastic rear windows of convertible automobiles. Developed by Goodrich during the war, it now finds peacetime application.

W. C. Hardesty Co. of Canada, Ltd., have announced a commercial grade of 12-hydroxy stearic acid, "Harwax A," a hard, amorphous solid which finds use in protective coatings.

The National Safety Council has published its new Occupational Safety Service Guide which provides company safety directors with a complete catalog of the many and varied accident prevention aids available from the Council. Service Guide 2.1 can be obtained without cost from the Council.

Monsanto has announced plans for the construction of multi-million dollar facilities for the production of isocyanates. The location of the new plant has not yet been announced.

American Hydrotherm Corp., Long Island City 6, N. Y., has made available a reprint of an article by Paul Geiringer, chief engineer of the company. Entitled "Tomorrow's Roll Surface Temperature Control and New Press Heating Systems," it was originally delivered as an address at the 1953 Technical Conference of the Society of Plastics Engineers and subsequently published in the "Society of Plastics Engineers Journal."

A handy new dual tire matching caliper, designed to give more efficient fleet operation and lower cost per mile for truckers, has been announced by U. S. Rubber.

Secretarial Service, 808 Western Saving Fund Bldg., Philadelphia 7, Penna., has announced the publication of the 3rd edition of the "Asbestos Factbook," a ready reference to data on asbestos.

A new bulletin showing the range of its engineered stainless steel fabrications has been made available by the Rodney Hunt Machine Co., Orange, Mass. Ask for Bulletin No. 53.

Taco-West Corp. of 525 N. Noble St., Chicago, Ill., has changed its name to the West Instrument Corp. The firm will have no change in officers and directors and will operate under the same management from the same address.

An eight-page booklet on "Lindol H.F.," a flame-resistant hydraulic fluid, has been released by the Chemical Division of the Celanese Corp. of America.

A new one-story brick and steel major distribution center is being constructed for Goodrich near the northern city limits in Columbus, Ohio. Goodrich has taken a long-term lease on the new building which will be owned by a private investor.

Corrosion-resistant tanks, fabricated throughout from "Agilide" unplasticized polyvinyl chloride, are now being offered by the American Agile Corp.

Good-rite Resin 50 is being used by the Atlantic Products Corp., Trenton, N. J., in molding rubber bottoms for the "Par-Bag" golf bag.

A new fractional horsepower V-belt catalog for use in servicing light duty applications has been announced by the Manhattan Rubber Division of Raybestos-Manhattan, Inc.

W. C. Dillon & Co. has revised its sales and engineering brochures on the Dillon Dynamometer, Model "L" and Low Range Testers. Ask for Bulletin D4, Bulletin 2, and Bulletin LR2, respectively.

A new rubber printing plate based on Hycar rubber has been developed by the Stereotype Equipment Co. of Chicago, Ill.

ADDITIONAL TECHNICAL PUBLICATIONS OF BRPRA MADE AVAILABLE

Abstracts of some of the recent publications issued by the British Rubber Producers' Research Association are published from time to time in RUBBER AGE. These booklets, which cover research work conducted by various members of the BRPRA staff, may be secured by writing the Association at 19 Fenchurch Street, London E.C. 3, England. Abstracts of some of the more recent publications follow:

Determination of Absolute Rate Constants for Olefinic Oxidations by Measurement of Photochemical Pre- and After-Effects. Part I. At "High" Oxygen Pressures, by L. Bateman and G. Gee; Part II. At "Low" Oxygen Pressures, by L. Bateman, J. L. Bolland and G. Gee. (Publication No. 146). The rate constants of the propagation and termination steps of the chain reaction responsible for the autoxidation of some non-conjugated olefins at 25° have been separately determined from measurements under non-stationary state conditions. The following generalizations are apparent: (1) The combination of an allyl radical with itself or with oxygen and the interaction of two allylperoxido radicals proceed at comparable rates, which are about a million times as fast as the dehydrogenation of an olefin by an allylperoxido radical; (2) The rate constant for the last reaction varies from olefin to olefin in an intelligible manner, while for the other reactions it appears to be roughly independent of olefinic structure. Important factors, particularly those due to the rate of solution of oxygen being comparable to certain rates being measured, which complicated the analysis of the experimental data are described and appropriately allowed for.

Adsorbed Films at Oil-Water Interfaces, by E. C. Cockbain and A. I. McMullen. (Publication No. 148): In this paper the adsorption of potassium laurate and sodium dodecyl sulfate at the benzene-water and n-decane-water interfaces has been calculated from interfacial tension data by means of the Gibbs Equation, and the results compared with the surface concentrations of typical spread monolayers at the same boundary pressures. Interfacial tension and adsorption data are also given for a number of oil-water systems containing surface active solutes in both the oil and water phases. Evidence is presented showing that molecular interaction at the interface, in the systems studied, is a factor of minor importance in determining the interfacial tension and composition of the adsorbed film.

Tautomeric Equilibria in 1:3(4):8-Triene-Type Olefins—An Investigation of Double-Bond Interaction Through Two Methylene Groups, by L. Bateman, J. I. Cunneen and (in part) J. A. Lyons. (Publication No. 149): Recent evidence and theories concerned with the existence of some structural peculiarity in 1:5-dienes are summarized. An attempt to determine directly whether these dienes are characteristically stabilized by resonance or otherwise is then reported. The experimental basis is to determine the effect on the tautomeric equilibria between 3-substituted 1-phenylprop-1- and -2-enes of a double bond, or equivalent unsaturated unit, situated two methylene groups distant from the displaceable 2-double bond. The results show conclusively that such stabilization is less than is expressed by a free-energy difference (at 165°) of 0.1 kcal.

Structural Influences Determining Tautomeric Equilibria in Phenylpropenes, by L. Bateman and J. I. Cunneen. (Publication No. 150): Three-alkyl substitution in 1-phenylpropene (II; $R' = R'' = H$) leads to the non-styryl-conjugated isomer (I) forming a measurable proportion of the equilibrated mixture in alkaline methyl-alcoholic solution at 165°. The influence of different alkyl groups may be correlated with (a) the extent of CH-bond first-order hyperconjugation, and (b) the operation of a specific effect on replacement of the CH_3 group by CHR. The experimental data permit the magnitude of these factors and also the resonance energy of the styryl unit to be evaluated. These quantities, and reasonable estimates of related quantities, are found to give fairly satisfactory analogous interpretations of the relative heats of hydrogenation of olefins and the equilibria between $\Delta^{\alpha\beta}$- and $\Delta^{\beta\gamma}$- unsaturated carboxylic acids, esters, and nitriles.

Analytical Studies Concerned with the Reactions Between Organic Peroxides and Thio-Ethers. Part I—Analysis of Organic Peroxides. (Publication No. 151); Part II—Analysis of Sulphoxides. Part III—Analysis of Mixtures of Peroxides and Sulphoxides, by D. Barnard and K. R. Hargrave. (Publication No. 152): These papers deal with some analytic problems concerned with the oxidation of organic sulfides, a subject of importance to the understanding of the aging of vulcanized rubber. In particular, the necessity has arisen for accurate methods for estimating hydroperoxide and sulfoxide groups, separately and together.

In Part I, the problem of hydroperoxide estimation is considered and a critical survey made of the many published procedures. A method employing stannous chloride as reductant is developed and, by standardization against several peroxides of known purity, shown to be capable of giving excellent results. The various factors influencing the accuracy and precision of the method are considered in detail.

In Part II, a reductometric method utilizing titanous chloride is described for the estimation of sulfoxides. A high order of accuracy can be achieved but for allylic sulfoxides, this is only so in the presence of thiocyanate ion. Possible reasons for such catalysis are discussed.

In Part III, it is shown that a mixture of hydroperoxide and sulfoxide can be satisfactorily analyzed for each constituent by a suitable combination of the above methods. It is necessary to divide a given sample into two aliquots, one being analyzed for hydroperoxide, the other for the sum total of hydroperoxide and sulfoxide. Modifications necessary when allylic sulfoxides are present are discussed.

The Electronic Structure of the Oxygen Molecule, by W. Moffitt. (Publication No. 153); Energies of excitation of different electronic states of the oxygen molecules are calculated by the method of antisymmeterized molecular orbitals (ASMO). These are compared with the observed spectrum. It is found that the ASMO theory is most disappointing. The reasons for the failure of the method are analyzed. As a result of this critical analysis, a modified method is proposed which is found to be very successful. The basis of this modification is that the approximation of using atomic orbitals should be made only in evaluating the interaction energy of the constituent atoms of a molecule, and not to assess their isolated term values. As a corollary, the location of two new states of the oxygen molecule is predicted.

Atoms in Molecules and Crystals, by W. Moffitt. (Publication No. 154): A new approach to the problems of the electronic structure of molecules is proposed. The basis for this treatment is the observation that the energies of atomization of molecules are small relative to their total energies. Accordingly, a perturbation theory is developed in which the unperturbed states consist of isolated atoms and ions, and the mutual approach of these atomic species is treated as the result of a perturbation.

In common with other theories, the total molecular eigenfunction is expressed linearly in terms of more simple functions. It is argued that when these more simple functions are of the orbital type, this expansion converges only slowly. On the other hand, if the orbital approach is abandoned, an expansion in terms of so-called composite functions will converge much more rapidly. This representation has the advantage that, at infinite internuclear separations, the composite functions are eigenfunctions.

A new use is found for atomic orbitals. They are used in order to construct approximate atomic functions, for which purpose they were orginally intended. These approximate atomic functions are then employed to estimate only the perturbation or interaction terms. The energies of the unperturbed states (isolated atoms and ions) must either be determined by the use of more complex atomic functions, or by an appeal to experimentally determine atomic term values.

The Velocity Coefficients of the Chain Propagation and Termination Reactions in Olefin Oxidations in Liquid Systems, by L. Bateman, G. Gee, A. L. Morris, and W. F. Watson. (Publication No. 155): The purpose of this new investigation of the kinetics of the liquid phase oxidation of olefins was twofold: (1) to study more completely the relative importance of the three termination reactions; (2) to try by improved experimental techniques to obtain more reliable estimates of the absolute velocity coefficients. It is shown that the cross termination process, between unlike radicals, is relatively more favored in the more reactive olefins. In contrast to copolymerizations, where only substituted-alkyl radicals are involved, no value of ϕ very much greater than I has been found, and in one example a fractional value was observed. New estimates of the velocity coefficients still leave much to be desired in accuracy. They show little variation between the magnitude of the different radical-radical reactions, and in this respect oxygen behaves as a radical.

The Rubber Hydrocarbon in Freshly Tapped Hevea Latex, by George Bloomfield. (Publication No. 156): Characterization of rubber hydrocarbon by intrinsic viscosity, osmotic pressure, light scattering, and sedimentation and diffusion methods has yielded considerable information on the size and shape of rubber molecules in solution, and has established that the rubber hydrocarbon of *Hevea brasiliensis* as normally handled in Europe and America comprises a series of polymer homologs with average molecular weight in the region of 500,000 to 1,000,000 and with a broad distribution of molecular weight from well over 1,000,000 down to less than 100,000. This paper summarizes the results of investigations recently carried out in Malaya to characterize the rubber hydrocarbon in fresh Hevea latex with respect to its molecular weight, as obtained by viscometric and osmotic measurements, and its molecular-weight distribution as revealed by fractionation.

Quantitative Characterization of Cure. Part I—Relationship between "Modulus" and "Strain" in Pure Gum Natural Rubber Vulcanizates, by R. F. Blackwell; Part II—Use of Modulus as a Measure of the State of Cure in Pure Gum Natural Rubber Vulcanizates, by W. P. Fletcher, G. Gee, and S. H. Morrell; Part III—Relation between Compound Viscosity and Vulcanizate Stiffness in Pure Gum Natural Rubber Vulcanizates, by R. F. Blackwell, W. P. Fletcher, and G. Gee; Part IV—Definition and Measurement of "Rate of Cure" for Pure Gum Natural Rubber Compounds, by G. Gee and S. H. Morrell. (Publication No. 157): The object of the investigation reported in Part I was to determine whether the relationship between strain (elongation) and modulus is sufficiently close for one to be calculated from the other. Stress-strain data have been recorded for loads of 2-10 kg./cm.^{2} for a series of ACSI and other pure gum compounds. It is shown that the strain at a fixed stress (5 kg./cm.^{2}) is uniquely related to the load required to produce an elongation of 100%. A tentative explanation of this observation is given in terms of the Mooney equation for the stress-strain curve. It is shown that the second constant of this equation does not vary greatly from rubber to rubber.

The purpose of the investigation described in Part II was to develop methods of measuring state of cure which involved only measurements normally available or very readily made. Swelling measurements, although suitable in theory, suffer the practical disadvantage of being time-consuming, but it is shown that they can be replaced very satisfactorily by modulus at 100% elongation. This is a good practical measure of state of cure for most purposes, and simple corrections are developed which extend its range of usefulness. An easily constructed machine is described for the accurate measurement of modulus at small elongations.

The aim of the investigation described in Part II was to study the dependence of vulcanizate stiffness upon the compound Mooney viscosity, and if possible to derive a method by which account could be taken of variations in viscosity in order to reduce the so-called mixing error in batches of test compound. Investigations covering a range of compounds, raw rubbers and curing times gave results which for the practical range indicated a relation between modulus at 100% elongation and Mooney viscosity. Using the relationship thus established, a method of adjusting modulus results to correspond to a standard Mooney viscosity was derived. Applications of the scheme to ACSI compound mixed from parts of the same lot of homogeneous raw rubber led to a considerable reduction in the range of modulus values.

The purpose of the paper described in Part IV is to develop a simple practical method of assessing rate of cure, based on sound theoretical principles, and using only measurements which are normally available or easily made. Mathematical and experimental studies of modulus-time curves are presented, and it is shown that several types of gum compound give curves of a simple mathematical form, equivalent to that of a first order chemical reaction. It is concluded in such cases "rate of cure" can be defined and measured by the value of a first-order velocity constant, having dimensions time^{-1} the reciprocal of which determines the vulcanization period needed to produce a given percentage cure. Application to a substantial number of rubbers has shown that the method is capable of yielding reproducible results for the rate of cure of a single compound, and of distinguishing with high significance between different compounds. A connection is predicted between rate of cure, as thus measured, and scorch; preliminary data are consistent with expectation.

The Free Energy of Deformation for Vulcanized Rubber, by R. S. Rivlin and D. W. Saunders. (Publication No. 158): Load-deformation measurements on a number of natural rubber vulcanizates covering a wide range of hardness are reported. For each of the vulcanizates the mean chain segment lengths obtained from swelling measurements are given. The results are consistent with the free-energy of deformation W depending on the strain variants I_1 and I_2 in such a way that $\partial W/\partial I_2$ falls as I_2 increases, but is independent of the vulcanizate for each value of I_2.

The Aggregation of Oil Particles in Emulsions, by E. G. Cockbain. (Publication No. 159): The reversible aggregation and disaggregation of oil particles (benzene or paraffin hydrocarbons) in soap-stabilized emulsions has been studied, employing rate of creaming data as the chief criterion of aggregation. In all the systems examined, aggregation of the oil particles commences at a soap concentration equal to, or a little greater than, the critical micellar concentration of the soap. In many cases, states of maximum and minimum particle aggregation occur at soap concentrations considerably higher than the critical micellar concentration. These maxima and minima are most pronounced with benzene as the disperse phase and unbranched hydrocarbon chain soaps as stabilizer. The results are explained on the basis of polymolecular adsorption which is considered to occur at soap concentrations greater than the critical micellar value.

A correlation exists between the effect of aliphatic alcohols (hydrocarbon chain $< C_8$) in reducing the concentration of soap required for aggregation of the emulsion particles and their effect on the critical micellar concentration of soaps. Addition of inorganic salts prevents disaggregation of the emulsion particles and reduces the soap concentration at which the aggregation commences. The latter process is independent of the nature of the salt anion when an anionic soap is used as stabilizer.

Geraniolenes: The Decomposition of 2:6-Dimethylhept-5-en-2-ol and Some Derivatives Thereof, by L. Bateman, J. I. Cuneen, and E. S. Waight (Publication No. 160): The mixtures obtained by dehydration of 2:6-dimethylhept-5-en-2-ol, by equivalent dehydrogenations and by decarboxylations of geranic acid have been analyzed. The first process usually yields olefins containing tetrahydro-2:2:6:6:-tetramethylpyran. Pure 2:6-dimethylhepta-2:5-diene has been isolated and characterized. Spectroscopic data on this diene, its $\Delta^{2,6}$-, $\Delta^{2,4}$-, $\Delta^{1,3}$-, and cyclic isomers, and on the above mention pyran are reported.

Brown Instruments Division, Minneapolis-Honeywell Regulator Co., Philadelphia, Penna., has released a set of 7 new specification sheets covering its flow meter line. Ask for Specification Sheets 241 through 247.

Local Arrangements Committee

Herman Boxser (Western Felt Works), chairman of the Local Arrangements Committee for the Fall Meeting of the Division of Rubber Chemistry, American Chemical Society, which is to be held at the Hotel Sherman in Chicago, Ill., on September 9 to 11, has announced the formation of various committees and their chairmen to handle details of the meeting. S. M. Lillis (Victor Mfg.) has been named assistant chairman of the Local Arrangements Committee. The following members of the Chicago Rubber Group, which is acting as host for the meeting, have been named to handle the activities noted: *Housing*, J. Sheridan; *Registration*, Maurice O'Connor (O'Connor & Choate); *Technical Activities*, H. A. Winkelmann (Dryden Rubber); *Technical Program Arrangements*, Bruce Hubbard (Ideal Roller); *Banquet*, Francis Frost (Frost Rubber); *Suppliers' Cocktail Party*, Charles Baldwin (United Carbon); *Publicity*, L. W. Heide (Western Felt Works); *Finance*, A. L. Robinson (Harwick Standard Chemical); *Ladies' Program*, John Groot (Dryden Rubber); *Plant Visits*, Howard Andersen (Rubber Engineering & Chemical). In addition, a committee consisting of Messrs. Lillis, Frost, Ayscue and Boxser has been formed to investigate the possibilities of presenting a practical exposition on rubber and rubber products at the meeting. The committee will report to Seward Byam (DuPont), chairman of the Rubber Division, on its findings.

Mansfield Modernization Program

A modernization program, including the construction of a new building equipped with the latest in tire manufacturing machinery, has been announced by the Mansfield Tire & Rubber Co. of Mansfield, Ohio. The program embraces two projects. The principal one is the construction of the new manufacturing plant costing in excess of $1,000,000, and the other calls for extensive improvements in the manufacturing facilities of the present main plant of the company. The new plant is scheduled for completion by January 1, 1954, and will become the company's Plant No. 3. The new structure will be of brick and steel construction, 200 by 260 feet, providing 52,000 square feet of floor space. The building will be one story in height with its equipment operating in a straight-line production operation. Its three-shift tire building capacity will be approximately 6,000 tires a day.

Columbia-Southern Appointments

Columbia-Southern Chemical Corp., Pittsburgh, Penna., has announced a number of new appointments. E. W. Haley has been named assistant to the vice-president with headquarters in New York. C. F. Bingham has been named director of sales with headquarters in Pittsburgh, while C. J. Stroemple and Foster G. Garrison have been named assistant to the manager of the Market Research and Development Department, and Keith S. Potts has been named statistician at the same department, all headquartered in Pittsburgh.

Andrews Gets English Post

John Andrews

Cabot Carbon, Ltd., British subsidiary of Godfrey L. Cabot, Inc., Boston, Mass., has announced the appointment of John Andrews as managing director of the Ellesmere Port plant, near Liverpool. Mr. Andrews succeeds George H. Cash, who has left England for Sarnia, Ont., Canada, where he will assume new duties as vice-president and general manager of Cabot Carbon of Canada, Ltd. Mr. Andrews has been associated with Godfrey L. Cabot, Inc., since 1945. Early in his Cabot career, he was assigned to the Sales Department where he concentrated particularly on sales of carbon blacks and plasticizers. Later, he was in charge of carbon black sales to rubber manufacturers in the New England area and also headed the newly-formed Plasticizer Division which has been expanded considerably in the past two years. Mr. Andrews holds a B. S. degree in chemical engineering from Tufts College School of Engineering. An active member of the Division of Rubber Chemistry of the American Chemical Society, Mr. Andrews was chairman of the Boston Rubber Group in 1952.

Ceylon to Subsidize Planting

The government of Ceylon is planning to subsidize the replanting of 100,000 acres of old rubber plantations with high-yielding trees over the next five or six years, according to a recent announcement. The rate of replanting is to be increased from 4,000 acres to more than 20,000 acres a year when the program gets into full swing. The project will be financed by a tax on the rubber when the new trees begin to produce.

Landers Names Collins & Aikman

Collins & Aikman Corp., New York, N. Y., has been named exclusive sales agent in the furniture field for plastic coated fabrics made by the Landers Corp. of Toledo, Ohio, under the trade name "Versilan." Landers is said to be the first company to produce commercially vinyl resin coated fabrics for upholstery purposes. Collins & Aikman will sell a new line of the Landers fabrics to the furniture trade in the fall.

Develops New Air Spring

A new air spring now in production by the General Tire & Rubber Co. is engineered to keep the floor of trailers parallel to the axles regardless of shifting loads, misloading, or high crown roads. This advance in spring performance is made possible by individual air control in each of the unit springs. Still in the testing stage are adaptions of the spring for single-axle trailers, busses, tractors and trucks. Key feature of the spring is automatically-controlled air pressure which keeps the trailer riding at the same height whether traveling empty or fully loaded. The weight of the vehicle and load are evenly distributed over five and a half feet of the frame, rather than concentrated at specific points. Because of the light weight of the spring, trucking owners and operators will be able to increase their payloads appreciably. High-frequency vibration, which causes metal fatigue in the body of the trailer and damage to perishable items, can be sizeably reduced by installation of this spring. In case of damage to the air system of the spring, rubber shock pads within the springs take over, enabling the trailer to continue to the terminal for repairs. This new spring development also offers the industry longer life on tires through controlled ride and positive braking action, plus a substantial reduction in operating and maintenance costs, the company stated.

Management Changes at Oakite

Following a recent meeting of the board of directors of Oakite Products, Inc., New York, N. Y., five changes in the management organization of the company were announced. H. Liggett Gray, formerly vice-president, was elected second vice-president. Frank L. Oldroyd was named vice-president, a position he will hold in addition to his present function as general sales manager of the Industrial Division. Eustace Lingle was elected vice-president to cooperate with the general sales manager in the direction of the sales organization and with the responsibility for the functioning of its engineering, technical services and sales development departments. Van Dorn C. Smith was also elected a vice-president. His work will involve consultation activities of a general technical and sales nature. George M. Seib, formerly assistant manager, has been elected secretary of the company.

Cord Reinforced Plastic Hose

Industrial Synthetics Corp., Garwood, N. J., has introduced its new "Suplex Standard Tuff-Ply Garden Hose," made of tire-cord reinforced vinyl. The cord reinforcement permits the hose to be shut off at the nozzle without danger of bursting. The new hose is said to be two-thirds lighter than rubber hose and delivers 50% more water than rubber hose of the same bore. The company states that flexibility and kink resistance are assured by the free play of the tire cord, the inner jacket of vinyl plastic is fused with the inner tube only. The hose is guaranteed for ten years.

Pequanoc Rubber Promotes Tuthill

Newton J. Tuthill

Pequanoc Rubber Co., Butler, N. J., has announced the election of Newton H. Tuthill to the newly-created position of executive vice-president and general manager. Mr. Tuthill was formerly vice-president and secretary-treasurer of the company. He has been associated with Pequanoc Rubber since 1947. Before that time he was affiliated with the American Hard Rubber Co. on the controller's staff. He is a graduate of Norwich University and the Harvard Business School. During World War II, he served in the U. S. Army as a major. Harry W. Chaudoin, formerly assistant secretary of the company, has been named secretary-treasurer of the concern succeeding Mr. Tuthill. Harold Watt has been named assistant secretary, succeeding Mr. Chaudoin. It was also announced that Pendennis W. Reed has resigned as president and general manager to devote full time to other interests. Mr. Reed will remain a director of the company, however. V. T. Norton, president of the American Hard Rubber Co., has been elected a director of Pequanoc Rubber to fill the directorship formerly held by the late Thomas N. D. Mace.

Installs Pelletizing Facilities

Alpha Chemical & Plastics Corp. of Newark, N. J., an affiliate of the Rotex Rubber Co., also of Newark, has put into operation new pelletizing facilities for the processing of plastics. Present operations are confined to coloring, screening and pelletizing of polyethylene, however, activities are soon expected to extend to the fields of styrene and allied molding and extrusion compounds. The milling, mixing and grinding equipment at the plant is presently being used exclusively for the processing of vinyl and vinyl scrap.

3M Acquires American Lava Corp.

Minnesota Mining & Manufacturing Corp. of St. Paul, Minn., has acquired the American Lava Corp. of Chattanooga, Tenn., through a $5,000,000 stock transfer. American Lava was founded in 1902 and produces more than 40,000 types of electrical insulating materials most of which are used in the manufacture of radio and television components.

More News in Brief

Tide Water Associated Oil Co. has announced that it will be the first and only major oil company to market its own brand of premium tire and puncture-sealing tube under the "Federal" trade name.

Warwick Wax Co., subsidiary of the Sun Chemical Corp., has appointed the N. S. Wilson Co., Boston, Mass., as exclusive New England distributor of Warwick waxes.

W. C. Hardesty Co. has announced a new addition to its line of products, sodium epoxystearate, an off-white powdered material containing a minimum of 90% of the sodium salt of 9,10-epoxystearic acid.

Celanese Corp. of America has purchased Marco Chemicals, Inc., of Linden, N. J., a pioneer in the development of polyester resins. Celanese will manufacture an expanded line of Marco products as part of its Plastics Division.

M. W. Kellogg Co. has revised its technical bulletin on the properties and applications of trifluorochloroethylene polymers. It is now available as Technical Bulletin No. 1-3-53, and contains new data on chemical resistance, permeability and optical properties of Kel-F.

An illustrated, two-color, 8-page bulletin describing the advantages and applications of rubber lining to steel tanks, drums, pipes, valves, fittings and pumps has been published by the Protective Coatings Division of Metalweld, Inc., Philadelphia, Penna.

Goodyear now has more than 100,000 employees worldwide, a new peacetime high peak of employment for the company in its 55-year corporate history.

Firestone has announced the award of 22 college scholarships to sons and daughters of employees of the company. The scholarships provide for full tuition, academic fees, textbooks and a contribution toward living costs.

"Products for the Mining Industry" is the title of a new, 8-page brochure recently released by the Boston Woven Hose & Rubber Co.

U. S. Rubber is using a distinctive new packaging called "Plasti-Guard" for all its U. S. Royal Golf Balls. Each golf ball is covered with an electronically sealed plastic covering that protects it until it is played.

Joy Manufacturing Co., Pittsburgh, Penna., has acquired Barnes and Reinecke, Inc., Chicago engineering company which specializes in mechanical research and development.

"Metallic Soaps as Gelling Agents for Plastigels," by K. Parker and L. Tritsch of the Witco Chemical Co., is now available from the company upon request.

Abernathy Promoted By DuPont

H. Herman Abernathy

H. Herman Abernathy has been named to the newly-created post of assistant sales manager-technical, according to a recent announcement by the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc. In this capacity, he will assist O. M. Hayden in supervising technical activities of the division's sales organization, as well as work performed in the rubber laboratories at Deepwater Point, N. J., and Akron, Ohio. Born in Vidalia, Ga., Mr. Abernathy received his master of science degree from Emory University in 1939, at which time he joined DuPont's Jackson Laboratory staff. The following year he transferred to the rubber laboratory for research and development work on latex and latex chemicals, becoming Latex Division head in 1946. Since 1952, he has been engaged in new products development work for the Rubber Chemicals Division. He is a member of Phi Beta Kappa, and the Division of Rubber Chemistry of the American Chemical Society. He has made a number of contributions to the technical literature on rubber.

New Bulk Latex Installation

Rubber Corporation of America, Brooklyn, N. Y., has completed a bulk storage installation for natural rubber latex at the U. S. Army Base in Boston, Mass., which is operated by the Tidewater Terminal, Inc. This installation will enable the company to receive and store bulk shipments of RCMA Centrifuged Latex at Boston and to give more efficient and speedy service to New England and Midwest users. The company will also carry stocks of GR-S latices for distribution in New England.

Lyons Joins Sindar Corp.

John R. Lyons has been appointed technical representative for the Sindar Corp., New York, N. Y. Mr. Lyons is a graduate of Holy Cross College where he received a B.S. degree in chemistry and biology. He was last employed as a technical representative for the Pacific Chemical and Fertilizer Co. and before that was an analytical chemist in the Quality Control Laboratory of the U. S. Gypsum Co.

NEW STANDARD NUMBERS FOR OIL-MASTERBATCH POLYMERS WITH INTERCHANGEABLE OILS

There appears below a list of the oil-masterbatch polymers which will be produced by the Office of Synthetic Rubber, Reconstruction Finance Corporation, beginning July 1, 1953. It will be noted that, except for oil interchangeability, no changes have been made. The new numbers of the various polymers are set forth in the left hand column, and a brief description of each polymer is given. The X numbered polymers which are being replaced by the new numbers are indicated in the right hand column of the list.

New Number	*Description*	*Polymer Replaced Effective July 1, 1953*
GR-S 1703	25 parts naphthenic oil* + 100 parts base polymer — 23.5% bound styrene, sugar free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped 41°F. reaction temperature, stabilizer = Wingstay S or equivalent—mean Mooney of masterbatch = 60 ML-4.	X-745
GR-S 1704	25 parts aromatic oil** + 100 parts base polymer — 23.5% bound styrene, sugar free, iron activated, rosin acid emulsified, carbamate shortstopped, 41°F. reaction temperature, slightly staining stabilizer—mean Mooney of masterbatch = 60 ML-4.	X-743 X-744
GR-S 1705	25 parts aromatic oil** + 100 parts base polymer — 23.5% bound styrene sugar free, iron activated 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41°F. reaction temperature, staining stabilizer—mean Mooney of masterbatch = 60 ML-4.	X-739 X-740
GR-S 1706	25 parts highly aromatic oil*** + 100 parts base polymer — 23.5% bound styrene, sugar free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41°F. reaction temperature, staining stabilizer—mean Mooney of masterbatch = 60 ML-4.	X-741 X-742
GR-S 1707	37.5 parts of naphthenic oil* + 100 parts base polymer — 23.5% bound styrene, sugar free, iron activated, rosin acid emulsified, carbamate shortstopped, 41°F. reaction temperature, Polygard or equivalent stabilizer—mean Mooney of masterbatch = 55 ML-4.	X-735
GR-S 1708	37.5 parts naphthenic oil* + 100 parts base polymer — 23.5% bound styrene, peroxamine activated, fatty acid emulsified, carbamate shortstopped, 41°F. reaction temperature, stabilizer Polygard or equivalent, Glue-acid coagulated—mean Mooney of masterbatch = 60 ML-4.	X-718
GR-S 1709	37.5 parts aromatic oil** + 100 parts base polymer — 23.5% bound styrene, sugar free, iron activated, rosin acid emulsified, carbamate shortstopped, 41°F. reaction temperature, staining stabilizer—mean Mooney of masterbatch = 55 ML-4.	X-724 X-725
GR-S 1710	37.5 parts aromatic oil** + 100 parts base polymer — 23.5% bound styrene, sugar free, iron activated 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41°F. reaction temperature, staining stabilizer—mean Mooney of masterbatch = 55 ML-4.	X-736 X-737
GR-S 1711	37.5 parts highly aromatic oil*** + 100 parts base polymer — 23.5% bound styrene, sugar free, iron activated, rosin acid emulsified, carbamate shortstopped, 41°F. reaction temperature, staining stabilizer—mean Mooney of masterbatch = 55 ML-4.	X-727 X-729 X-731
GR-S 1712	37.5 parts highly aromatic oil*** + 100 parts base polymer — 23.5% bound styrene, sugar free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41°F. reaction temperature, staining stabilizer—mean Mooney of masterbatch = 55 ML-4.	X-726 X-728 X-730
	Oil-Black Masterbatch Polymers	
GR-S 1801	25 parts naphthenic oil,* + 50 parts HAF black + 100 parts base polymer — 23.5% bound styrene, sugar free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41°F. reaction temperature, staining stabilizer—mean Mooney of masterbatch (compounded) = 65 ML-4.	X-746

* Currently, Circosol 2XH only. ** Currently, Shell SPX-97 and Sundex 53. *** Currently, Califlux TT, Dutrex 20 and Philrich 5.

Emulsion Adhesive 1294-31L

American Resinous Chemicals Corp., Peabody, Mass., has introduced a new emulsion adhesive, "1294-31L", which is said to provide strong heat-resistant bonds to paper, fabric, leather and many other surfaces. The adhesive is said to be ideal for users who do not have curing temperatures available. Mild heat may be used to promote bond formation but is not essential, the company maintains.

J. M. Huber Corp. has announced that it paid to its employees more than $1,200,000 out of 1952 earnings under its profit sharing and retirement plans.

Announces Refinancing Program

A refinancing program which will provide an additional $1,000,000 in working capital has been announced by the Seiberling Rubber Co. of Akron, Ohio. Negotiations have been completed with the Penn Mutual Life Insurance Co. of Philadelphia, Penna., for a loan of $2,000,000 at 4½% interest, half of which will retire the company's present note amounting to $1,000,000, with the balance to be used for working capital. Announcement of the new financial arrangement with Penn Mutual was made by R. J. Thomas, vice-president and treasurer of Seiberling.

Vulcanized Oil Dispersion Line

On or about September 1, 1953, the Crusader Chemical Co., Inc., 1075 Hull St., Baltimore 30, Md., will begin the manufacture and distribution of vulcanized oil dispersions formerly produced under certain U. S. patented procedures by the Stamford Rubber Supply Co. of Stamford, Conn. Stamford Rubber Supply discontinued the manufacture of these dispersions on June 30.

Stein, Hall & Co., Inc., has been awarded the City of New York Certificate of Business Merit for economic and community services to the city.

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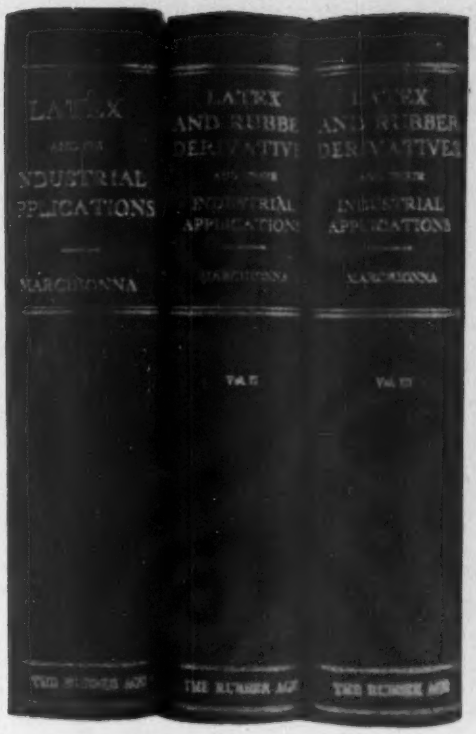

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Firestone Army Order Challenged

Representative Augustine B. Kelley (Dem., Penna.) has accused the U. S. Army of giving him "double talk" about the awarding of a contract for the production of gas masks to the Fall River, Mass., plant of the Firestone Tire & Rubber Co. Mr. Kelley complained to Army Secretary Robert T. Stevens that the Pennsylvania Rubber Co. of Jeannette, Penna., in his district was the low bidder by $100,000. He wired Mr. Stevens asking why. Mr. Kelley said he received a reply from one of the Secretary's assistants "which evaded the question entirely." Meanwhile, an Army spokesman said that although Pennsylvania Rubber was the low bidder by $100,000, the Army by law had to give the Fall River plant a chance to match the bid because it was in "Category IV," indicating it was a distressed area. The Fall River plant matched the bid and received the contract. Three days later the Labor Department shifted the Fall River area to Category III, the same as the Pennsylvania district. The Army's legal office ruled the contract had been awarded and was binding. Some time later it was announced that Pennsylvania Rubber had been awarded a Navy contract for the production of gas masks. Mr. Kelly said that this alleviated the situation somewhat, but that he would continue to fight for a reversal of the Army contract.

Court Rules for RCA Rubber

A Federal District Court in Cleveland, Ohio, has ruled that the RCA Rubber Co. of Akron, Ohio, founded by Cliffiord E. Reiss, Paul P. Crisp and the late Harry C. Allyn, could continue to use its present initials on its trademark, but must drop a diamond-shaped insignia around them. The diamond is too similar to the circle the radio company uses around its initials, the court ruled. The rubber firm was founded in 1932. Shortly after World War II, the company started advertising nationally. The radio RCA then objected in court to the rubber RCA, contending the public would believe the firms were connected. The court said that the rubber firm founders must have been "conscious of the potential value of the letter sequence as a corporate or trade name." It was held, however, that to deprive the firm of the name at this stage would deprive it of the good will it has built up. The court forbade the rubber company to use the letters as an insignia separate from the corporate name, and ordered it to designate itself as "an Ohio corporation."

Dobberstein Anniversary Marked

Arthur W. Dobberstein, vice-president in charge of manufacturing for the International Latex Corp., Playtex Park, Dover, Del., was honored at a surprise dinner-dance on June 5 in Dover by employees and officials of the company in recognition of his completion of 20 years' service to the company. Mr. Dobberstein and his wife were awarded a trip to Europe by the company, while A. N. Spanel, founder of the company and chairman of the board, and W. O. Heinze, president, presented them with a solid silver service. Nearly 300 persons attended the celebration.

Joins Pioneer Rubber Mills

J. R. Keach

J. R. Keach, formerly vice-president and general manager of the Quaker Rubber Co., Philadelphia, Penna., has joined the Pioneer Rubber Mills of San Francisco, Calif., as assistant to the executive vice-president. Before his association with Quaker Rubber, he was general plant manager of the five Industrial Division plants of the Firestone Tire & Rubber Co. While attending Butler University in 1924, Mr. Keach was a member of a basketball team that won the national AAU championship. Following his college career, he also played basketball for two years on the Firestone team.

New Low-Cost Truck Tire

U. S. Rubber Co. has introduced a new low-cost truck tire, the "U. S. Tire," designed and manufactured particularly for small trucks used in rural areas. The new tire is being marketed in sizes ranging from 6.00-16 for light pickup trucks to 10.00-20 for heavier commercial models. Company officials state that the new tire has safety bonded cord, in which each individual cord in each ply is completely rubber coated, two shock pads under the tread and shoulders, anchored beads of high tensile strength steel, and ventilated tread and shoulders. In addition, the company says, the tire has a tough, thick tread made wide and flat to give even wear. It has a sturdy carcass of rayon that is cool running, and resists heat and bruises. It also has a notched rib for good traction and steering, and tough sidewall vent design as protection against snags and cuts.

Offering Additional Shares

National Rubber Machinery Co., Akron, Ohio, recently made application to list an additional 19,556 common shares on the American Stock Exchange which were offered to common share holders of record on June 24. The subscription offer entitled each shareholder to purchase at $13.00 a share, one additional common share for each nine shares then held. The offer was to expire on July 15. The offering letter and subscription certificates were mailed to shareholders on June 26.

Federal Chemicals Corp. Formed

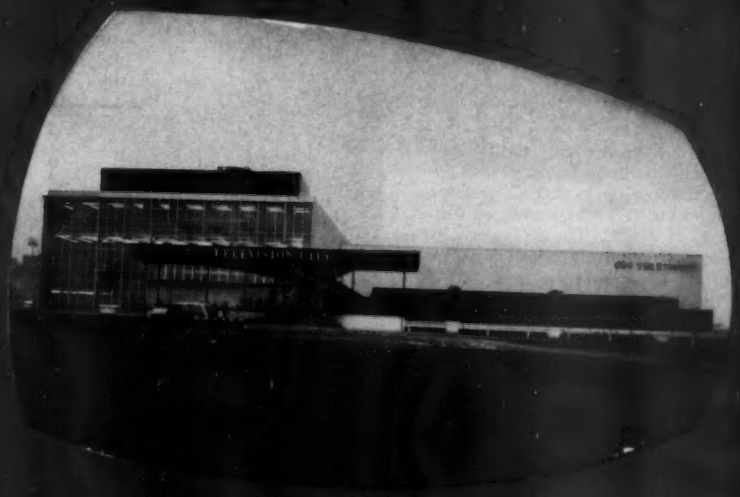
Federal Chemicals Corp. has been formed at 210 Wythe Ave., Brooklyn, N. Y., to supply the plastisol and organisol fields. Manufacturing and technical operations will be carried out at the Brooklyn address and also at the factory of the company's affiliate, the Adex Manufacturing Co. of Baltimore, Md. Officers of Federal Chemical include Philip M. Liner, president; Arthur Mayer, vice-president; and Mortimer E. Stern, secretary-treasurer. Samuel W. Strickman, long a consultant in the vinyl field and holder of a number of patents, has been named general manager of the new company. Consumers of vinyl plastisols and organisols will be supplied with tailor-made products suited to their particular needs. A special feature, according to the company, will be free technical consulting service, established to assist in the organization of new fabricating plants or in the reorganization of established plants utilizing the most advanced techniques. In addition to supplying the toy and novelty fields, the Plastics Division of Federal Chemicals plans to service highly technical and industrial applications, such as the electronic, electrical, X-ray, medical, and meteorological fields.

Introduces New Plasticizer

Archer-Daniels-Midland Co., Minneapolis, Minn., has announced the introduction of a new polymeric type vinyl plasticizer. Under development for three years, the new product is an epoxydized soybean derivative. Although production is licensed under a Department of Agriculture patent, processing techniques have been improved and perfected by the Archer-Daniels research staff, which includes pilot processing. This new plasticizer is said to have nine primary features: Non-volatility, low extractability, excellent mill behavior, very good low-temperature flexibility, excellent ultra-violet light resistance, excellent heat resistance, low viscosity, outstanding stabilizing properties and economical prices. In addition, it is odorless and light-colored. Pilot plant samples are available now for evaluation work. The new plasticizer is recommended by Archer-Daniels for use in flexible sheeting, flexible film, plastisol and organisol dispersions, molding and extrusion compounds.

Armeen HT Mold Release Agent

The Chemical Division of Armour & Co., Chicago, Ill., has announced "Armeen HT," a mold release agent for hard rubber of Durometer hardness 90 on the A scale. Armeen HT is said to give excellent extrusion rates, controls sulfur bloom, and eliminates the use of expensive external mold lubricants. Further, better adhesion of fillers to the rubber is obtained, and less costly fillers may be used, the company states. Shorter milling time is also required, thus increasing the capacity of existing equipment. Armeen HT may be milled directly into the rubber stock. Proper proportions of the material to rubber hydrocarbon content range from 2.5 to 5.0%. The Armeen may produce some accelerating effect, but then the accelerator content can be adjusted, Armour says.



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Brown Co. Promotes Goodloe

Paul A. Goodloe

Dr. Paul A. Goodloe, associated with the Brown Co., Boston, Mass., since 1946, has been named assistant director of the Research and Development Department of the company. Dr. Goodloe had been in charge of the Technical Service Division for "Solka-Floc", the company's finely-divided form of alpha-cellulose. A native of Kentucky, he attended the University of Kentucky and was graduated from Johns Hopkins University with a Ph. D. in organic chemistry. Prior to joining the Brown Co. in 1946, he spent ten years in various supervisory positions in the laboratories of the Socony-Vacuum Oil Co. At the same time, it was announced that Robert A. Webber had been named administrator of the Research and Development Department, and that Douglas H. McMurtrie and Harold R. Titus have been named senior research associates.

Promoted By Seiberling Rubber

C. Sterling Parker, formerly truck tire sales representative, has been named manager of truck tire sales for the Seiberling Rubber Co. of Akron, Ohio. He succeeds George A. Wiedemer, who recently retired after more than 31 years with the company. Mr. Parker joined the firm's Merchandise Distribution Department in 1922 and also worked in the Service Department during his early years with the company. After leaving Seiberling Rubber for several years, he returned in 1943 as superviser in mileage sales and in 1945 was named department manager. Latter, he was territorial representaive and special representative of the Truck Tire Sales Department. A native of Gambier, Ohio, Mr. Parker attended Kenyon College and Akron University.

Named Technical Tape President

Maxwell I. Schultz has been elected president of the Technical Tape Corp., New York, N. Y., succeeding Paul Cohen, who has been named chairman of the board. Alfred R. Leiserson has been elected senior vice-president while Peter Smillie has been elected vice-president in charge of industrial sales. Frederick I. Wershaw has been elected vice-president in charge of consumer sales.

Silicone Insulation Approved

Underwriters' Laboratories have approved a new type of silicone rubber insulated wire produced by the Essex Wire Corp. of Fort Wayne, Ind. The stranded conductor of the wire is electrically insulated by a flexible extruded coating of "SE-460" silicone rubber produced by the Silicone Products Department of the General Electric Co. Seven sizes of the new "Sil-X" wire have been approved for use in lighting fixtures up to 200° C. and for radio and television hookup wire at temperatures up to 150° C. On application by specific users, nineteen other sizes of wire and cable will be approved by the Underwriters' Laboratories for devices and appliances operating up to 200° C. All sizes are coated with G-E silicone rubber in thicknesses ranging from 15 to 77 mils. Covered with a special lacquered glass braid having excellent abration resistance, the silicone insulation on Sil-X wire is flexible at —60° F., yet retains desirable physical and electrical properties up to 400° F. In addition to its special application to the wire and cable field, SE-460 is also suitable for general extrusion and molding purposes.

Demountable "Innacush" Tire

The growth in size and volume of the materials handling industry has been so great that U. S. Rubber Co., which is said to have introduced the industry's first heavy duty demountable industrial solid tire as optional original equipment, will now offer its demountable "Innacush" solid tire for field changeover purposes. These new units will be offered initially in three sizes to replace ten sizes of existing industrial pressed-on solid and pneumatic tires. The demountable "Innacush", according to the company, is especially designed for a split wheel that is tapered to 12½ degrees and slightly larger than the tire so that there is maximum compression when the wheel is bolted together. The bead wires in the hard-rubber base prevent tire stretch or slippage under severe operating conditions, and the tires can be changed in ten minutes or less. In addition, it has the special fully-cured dual compound construction of regular "Innacush" solids. It has extra cushioning vibration dampening, and low rolling-resistance, U. S. Rubber states.

General Electric Promotes White

Burton B. White has been named supervisor of silicone rubber sales development for the Silicone Products Department of the General Electric Co. at Waterford, N. Y. He will serve as consultant to design engineers in the automotive, aircraft and other industries using silicone rubber parts. Mr. White, a native of New Haven, Conn., is a graduate of Yale University. He joined G-E in 1946 as a chemist at Bridgeport, Conn. He later transferred to the company's Trenton, N. J., plant as laboratory supervisor on design and materials engineering work. Since 1951, he has been an application engineer at Waterford, providing technical assistance to fabricators of silicone rubber.

Testimonial Dinner for Spoerl

W. F. Spoerl

On June 25, executives of the mechanical rubber goods manufacturing industry attended a testimonial dinner at the Hotel Warwick in New York City for W. F. Spoerl, who recently retired as general sales manager of mechanical rubber goods for the U. S. Rubber Co. Mr. Spoerl had been associated with U. S. Rubber for 43 years. He plans to spend much of his time at his summer home at Lake Winnipesaukee, Maine. The industry representatives presented him with a 25 hp outboard motor together with a number of appliances for his boat.

Named Fidelity-America President

Howard I. Green, who recently resigned his position as a vice-president and a director of the Fidelity Machine Co., following the sale of his interests, has been named president of the Fidelity-America Financial Corp., Philadelphia, Penna. Fidelity-America was recently organized by a small group of prominent business, legal and financial figures to do commercial financing in the Greater Philadelphia industrial area. The new company will concentrate its services in the rubber industry and will specialize in accounts receivable financing. The company will also handle financing for government contracts, inventories, drop shipments, installment sales, machinery and equipment, mortgages, rediscounting, purchasing a business, and buying out partners.

AMF Establishing New Laboratory

American Machine & Foundry Co., New York, N. Y., will establish a chemical research and development laboratory in Springdale, Conn., as an expansion of research and development activities of its Chemical Research Department. G. P. Hungerford, research manager, will continue to direct the activities of the laboratory, which is presently located at the company's Brooklyn plant. AMF has purchased a one-story, 12,000 square-foot building in Springdale for the new laboratory. The laboratory's activities will include the research and development of new products and processes in the fields of foods, tobacco, plastics, electrical insulation, general chemical technology, and the design of processing equipment in these fields.

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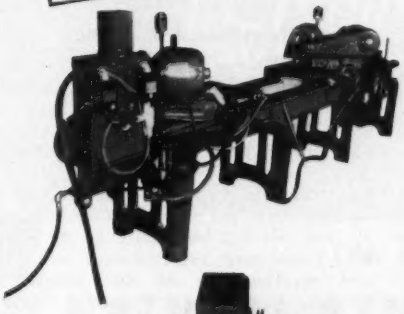

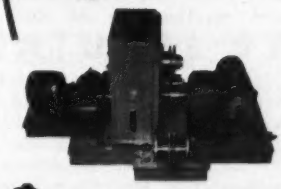

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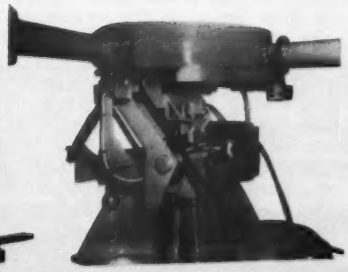

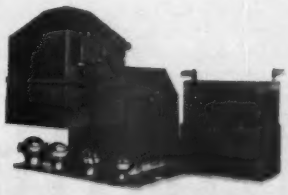

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"Safetyliner" Tubeless Tire

A new, low price tubeless passenger car tire which protects against blowouts was placed on sale recently in Houston for the first time anywhere by the B. F. Goodrich Co. of Akron, Ohio. Called the "Safetyliner," the new tire features a patented inner lining of rubber which retains air, thus eliminating inner tubes which are the cause of blowouts. The original, puncture-sealing version of the tubeless tire, introduced by Goodrich in 1948, has been on sale in the Houston area since January, 1951, and remains in the line. Houston was selected as the kick-off spot for public sale of the Safetyliner because of the great demand in Texas for a low cost tire that will run safely long distances at high speed in hot weather, according to Guy Gundaker, Jr., Goodrich general manager of replacement tire sales. According to Mr. Gundaker, the Safetyliner tire protects against blowouts because it has no inner tube to be pinched and chafed in tire cord bruise breaks. Patented rim-sealing ridges lock the tires to rims. The new tire is smoother riding, permits better handling and easier steering because of its lighter weight, Mr. Gundaker said. Engineering tests, he added, prove that tubeless tires give longer mileage than a tire with tube and that dangerous heat build-up caused by heavy tubes is avoided.

Firestone Wins Safety Award

The Firestone Tire & Rubber Co. has been awarded the highest honor in industrial safety for the seventh time in eight years, with the presentation of the Award of Honor of the National Safety Council. The award was again given on a company-wide basis, which means that all of the company's plants in the United States and in foreign countries share in the recognition the company receives for its outstanding safety records. According to the NSC, Firestone plants are among the safest in all industry. Firestone is the only rubber company that has received the nation's top award as many as seven times. The record of the company's plants in 1952 was the lowest it has ever attained, the accident frequency rate going down to 1.8 from the previous year's all-time record of 2.0 The frequency rate of 1.8 lost-time accidents for each million man-hours worked is well below the latest available national frequency average for the rubber industry of 5.9 accidents per million man-hours worked. Twenty-eight of the company's 30 plants throughout the world had frequency rates for 1952 below the national average.

Emulsol Departmentalizes Sales

Due to the substantial increase in sales of its chemical products, the Emulsol Corp., Chicago, Ill., has departmentalized its sales organization. M. H. Joffe has been named vice-president in charge of sales, while Carl F. Piowaty, vice-president in charge of egg solids operations will be in complete charge of sales of egg solids products. E. S. Thayer and S. Epstein will be in charge of chemical products sales with Arthur Rabinovitz, who recently joined the company from the Abbott Laboratories.

Smart Named District Manager

Burton Smart

Burton Smart, associated with the United Carbon Co. for the past six years, has been named southern district sales manager for the company. He will be in charge of the newly-opened sales office in the Sterick Building, Memphis, Tenn. Mr. Smart was graduated from Cornell University in 1933. In that year, he joined the S. D. Warren Paper Co. in Westbrook, Maine. Starting as a technician in the control laboratory, he was later transferred to research work and made assistant to the director of research. Mr. Smart served with the U. S. Army from 1940 to 1947, attaining the rank of lieutenant-colonel. During the six years of his association with United Carbon, he has served as sales and technical representative in the New York and Charleston offices. Mr. Smart is a member of the Division of Rubber Chemistry of the American Chemical Society and the SAE-ASTM Committee on Automotive Rubber.

Monsanto Signs Vinyl Accord

Monsanto Chemical Co. has announced the signing of an agreement with New York designers John and Earline Brice and the Jason Corp. of Hoboken, N. J., looking toward the co-ordination of efforts of the three groups in the production of a wide variety of vinyl plastics materials for home furnishings and other applications. Jason Corp. is now expanding its production facilities to handle converting operations, including texturizing, printing and lamination of vinyl film. The combined styling and technical resources of all three organizations will be made available in the new converting and styling operation, Monsanto stated. Jason Corp. is the originator of "Sealtuft" plastics, embossed as to simulate quilting.

Rubber Road for New Jersey

The New Jersey Highway Commissioner recently announced that a state road would be resurfaced with a mixture containing powdered rubber. Approximately four miles of White Horse Pike in Atlantic County will be paved with about 6 pounds of rubber to every ton of asphalt.

Jet Aircraft Tubeless Tire

What are said to be the first high pressure tubeless tires for use on combat jet aircraft have successfully completed preliminary flight tests, the B. F. Goodrich Co. recently announced. Developed for the Navy by Goodrich, the new tires are expected to assure high-speed take-offs and landings, save weight and simplify assembly and maintenance. The main landing tires are 24 inches by 5.5 inches in size, inflated to 300 pounds per square inch air pressure for carrier operations. The nose wheel tire is 18 inches by 5.5 inches inflated to 175 pounds per square inch. Basic construction principles of the new tubeless airplane tires, according to Goodrich, are similar to those patented and used in the rubber company's tubeless tires for passenger cars, introduced six years ago. A layer of special, synthetic rubber inside the tire seals in air, replacing an inner tube. Ridges molded on the outer sides of tire bead prevent loss of air around the rim flange. Special wheels, modified by B. F. Goodrich for use on tubeless airplane tires, features an "O" ring seal which forms an airtight chamber between tire and wheel. The magnesium wheels are specially treated against porosity.

Promotions at N. J. Zinc

Philip M. Giner has been elected a vice-president and George F. Halfacre has been appointed manager of manufacturing of the N. J. Zinc Co. Mr. Ginder is also vice-president of the N. J. Zinc Co. (of Pa.), having progressed through that organization from the position of chemist, which he assumed at the time of his employment in 1911. He has been chief of the Slab Zinc Department, superintendent and general superintendent of that company's Smelting Department at Palmerton, Penna. He is a graduate of Lehigh University. Mr. Halfacre, likewise, started with the company as a chemist and has been in its employ since 1918. He has held successively the positions of assistant chief and chief of the Slab Zinc Department, superintendent of the West Plant, assistant superintendent and general superintendent of the Palmerton plant. He is a graduate of the Massachusetts Institute of Technology.

Reports on European Outlook

Pierre S. du Pont, III, assistant director of sales for the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., recently returned from a four-week swing through major industrial centers on the continent. He reported that optimism keynotes the European rubber industry's outlook, with many European manufacturers announcing plans for stepping up production in all lines of rubber goods to facilitate long-range programs of expansion and modernization. Mr. du Pont noted a growing tendency toward self-reliance among manufacturers abroad. Conferences of rubber manufacturers and technicians in London, Paris, Cologne, and Milan heard Mr. du Pont speak on the development of neoprene, its outstanding properties, and some of the numerous applications where its superiority is established.

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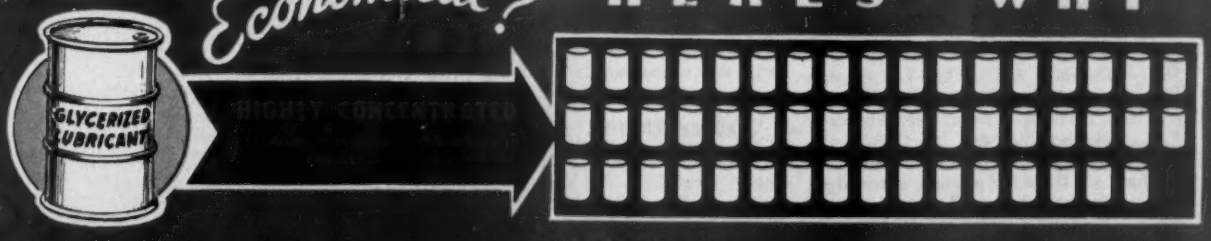

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New Rubber Soling Method

The current issue of *Rubber Developments* describes a new combination-method of applying rubber soles that is said to make obsolescent the conventional procedure of building the article up on a last to its final shape, piece by piece, and then vulcanizing it in an autoclave without use of a molding press. The essential feature of the advanced method is that the bottom is bonded to the upper, molded to its final contours and then vulcanized in one operation. The bottom comprises one or more roughly shaped blanks of unvulcanized rubber together with other components such as felt fillers, a wood heel and a shank, i.e., waist reinforcement. All these are bonded together in the same process. The machines used for producing molded shoes fall into two broad categories, a simple type called a "sponge machine," and a more involved mechanism designated as a "pressure machine." Both these machines and the molding methods involved in each are fully described and diagrammed in the article. The issue of the publication containing this information is available without charge from the Natural Rubber Bureau, 1631 K St., N.W., Washington 6, D. C.

Develops New Recapping Material

Seiberling Rubber Co. has developed new type "valley" die sizes of rubber stock which eliminate extra steps and added cost in re-capping truck tires and retreading earthmover tires. The die sizes are available in cold rubber stock for truck tires and in a natural rubber, hard-tread compound for earthmovers. The company stated that these die sizes were developed for use where tire shoulders have "dropped" until it is impossible to maintain correct buffing contour. The extra shoulder thickness of the valley die sizes make up for shoulder drop-off and make it unnecessary to build up with baby camelback or a similar material. "Dropped shoulders" may be caused by numerous buffings, shoulder cuts, uneven tread wear, driving conditions or mechanical difficulties, the company pointed out. For earthmover tires the die sizes are available in six full tread widths. Two larger sizes, 18.00 and 21.00, are available in full widths or in three-piece construction.

Parker Merges Operations

On July 1, 1953, the operations of the Synthetic Rubber Products Co. of Los Angeles, Calif., were merged with those of the parent company, the Parker Appliance Co. of Cleveland, Ohio. The Los Angeles operations are now known as the Rubber Products Division of the Parker Appliance Co., with headquarters at 1538 South Eastern Ave., Los Angeles 22, Calif. As of June 30, Parker Appliance assumed all outstanding liabilities of the Synthetic Rubber Products Co. and assumed all commitments on outstanding purchase orders. From and after July 1, all billings and shipments should be made in the name of the Rubber Products Division of the Parker Appliance Co. Other than the change in name, no other changes are contemplated in the method of operation.

Forms Wharton Jackson Co.

Wharton Jackson

Wharton Jackson, formerly associated with the Georgia Kaolin Co., has formed a new sales organization with headquarters in the Petroleum Building, 714 West Olympic Blvd., Los Angeles 15, Calif., and offices at 99 Hudson St., New York 13, N. Y. The Wharton Jackson Co. has already been appointed exclusive sales agents for Huntley Industrial Minerals, Inc. of Bishop, Calif., for its line of non-metallic minerals, including talc, prophyllite, mica, asbestos, clays, and special aluminum and magnesium pigments. Announcement of additional representation will be made in the near future. Mr. Jackson has been actively engaged in the non-metallics field for the past 20 years. He is a member of the Division of Rubber Chemistry of the American Shemical Society, the American Ceramic Society, and the American Society for Testing Materials.

Marvin Joins Michigan Chemical

Theodore Marvin, associated with the Hercules Powder Co. for the past 30 years, has been named president of the Michigan Chemical Co. of St. Louis, Mich. Donald D. MacFarlane, chairman of the board of Michigan Chemical, had been acting president since the resignation of R. P. Place about six months ago. At Hercules Powder, Mr. Marvin participated in the diversification of products, manufacturing, merchandising, advertising, sales promotion and public relations. At Michigan Chemical, he will supervise the expansion program now under way to intensify the production of products connected with the bromides, magnesiums and chlorides.

National Electric Products Moves

National Electric Products Corp., formerly located in the Chamber of Commerce Building, Pittsburgh, Penna., has moved its executive offices, sales and several other departments to 140 Stanwix St., Gateway Center in Pittsburgh. The Purchasing, Traffic, Service and Export Departments as well as part of the Accounting Department have been transferred to the company's enlarged offices at the Ambridge, Penna., plant.

Marvinol VR-22 Vinyl Resin

A new vinyl resin, designed for dry blend feed of extruded products such as wire jacketing, tubing, welting, garden hose and similar products, has been developed by the Naugatuck Chemical Division of the U. S. Rubber Co. The new resin, known as "Marvinol VR-22", is a straight polyvinyl chloride resin of high molecular weight. It rapidly absorbs plasticizer in heated mixers and is said to give a dry, free-flowing mix of high uniformity. In addition to use in conventional dry blend equipment, it can also be used in open mills or Banbury mixers for calender operations. The company states that Marvinol VR-22 won't bridge or pack in the extrusion feed, and has a fast drying time that allows cycles to be speeded up. It also fuses quickly, giving extrusions that are smooth, uniform, and free of "fish eyes". The new resin can be formulated with high amounts of plasticizers of varying types. Tests also show, the company claims, that compounds made from it have excellent inherent heat stability and because of its high molecular weight excellent resistance to heat deformation under load.

Hewitt-Robins Welding Hose

Hewitt-Robins Inc. has announced an improved rubber hose for gas welding apparatus which is said to withstand greater heat and flame than any previous hose. It is also said to be noteworthy for its light weight and ability to resist grit, sharp metal and oil to which welding hose is frequently exposed. The improved hose has a neoprene synthetic rubber cover for flame resistance and a rayon reinforced carcass which, according to laboratory tests, offers greater strength and longer life than the conventional cotton reinforcement. The hose has double tubes, one for acetylene gas and the other for oxygen, and both are vulcanized together to form an integrated whole. This construction eliminates the twisting and knotting which often occurs when two separate hose lines are used. The hose has a working pressure of 200 pounds per square inch. It will be furnished in lengths up to 500 feet and in various diameters to fit any type of welding apparatus.

Tubeless Tire With Nylon Cord

What is said to be the first tubeless tire to be developed with high-strength nylon cord thus combining the safety features of tubeless tire construction with the extra strength of nylon cord has been announced by the Firestone Tire & Rubber Co. Rubber compounds and new construction features which this year proved themselves capable of withstanding the hottest and one of the fastest 500-mile races ever run at the Indianapolis Motor Speedway have been incorporated in this new tire which has been named the "Fireston 500." The tire has a newly-designed tread with built-in rib stabilizers and specially cut traction slots to reduce the noise on curves and turns and to increase the traction of the tire on all road surfaces. Production of this new nylon tubeless tire is expected to be on a volume basis in the near future.

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Better Highway Program Kit

A basic program to assist in the achievement of a "Better Highways—Better Drivers" goal was recently released by the Inter-Industry Highway Safety Committee for use by automobile and tire dealers. In announcing release of the new program kit, entitled "What You Can Do About Highways, Parking and Traffic Safety . . . and How To Do It," Mr. W. F. Hufstader, chairman of the committee and a vice-president of General Motors, said: "The American people have left no doubt about their desire to own and use automobiles. But they want more than automobiles. They want — and need — automobility. I believe the public is willing to support sound highway improvement and safety activities," Mr. Hufstader added, "but many interested people, including dealers, do not always know just what to do or how to do it. The Committee hopes that this new kit of materials will help dealers to participate even more fully than heretofore in constructive civic programs aimed at traffic improvement." Special emphasis is given in the kit to the desirability of holding state and local Teen-Age Traffic Safety Conferences to give young people an opportunity to participate in plans for greater safety and efficiency on the streets and highways, and to help them become good drivers.

Nylon Cord Passenger Tire

A new passenger car tire which combines the advantages of greater resiliency, lightness and strength of all-nylon cord with a new tread rubber capable of increasing mileage by more than 20% has been announced by the Goodyear Tire & Rubber Co. The new unit will sell for only slightly more than conventional tires, thus placing an all-nylon tire within the reach of the average motorist. Known as the "All-Nylon Cord Super-Cushion", the new product is an evolution of the company's original super-cushion, one of the first of today's low-pressure tires to be introduced. Now, Goodyear in this newest unit, in addition to tread and other improvements, has added the all-nylon cord feature. The 20% added wear in the new tire stems from its tread, composed of recently developed and longer-lasting compounded rubber, which, the company states, is capable of delivering a thousand more tire miles for each five thousand miles of driving.

Chemical Industries Exposition

International Exposition Co., New York, N. Y., has announced that the Exposition of Chemical Industries, held in New York almost continuously since 1915, will move to the Commercial Museum and Convention Hall in Philadelphia, Penna., for its 24th biennial run, November 30 to December 5, 1953. A substantial increase in exhibit area will make it the largest display of its kind ever held. Many former exhibitors are said to be taking advantage of the new move by planning expanded layouts, while nearly one hundred new exhibitors have already engaged space. A record-breaking attendance is expected.

Rejuvenating Golf Balls

Federal International Co. of New York, N. Y., is now offering a white paint for the rejuvenation of old golf balls. Packaged in an aerosol type can, the paint is sprayed on old golf balls which have been washed in soap and water. When a valve is pressed on the can, the paint sprays out and the ball gets a new white coating. The aerosol-type can comes with a special wire holder which holds the ball while it is being sprayed.

Goodrich Develops "Vulcafilm"

A new film which combines the properties of plastics and synthetic rubber and which can be electronically sealed to itself has been announced by the B. F. Goodrich Co. Called "Vulcafilm," the new material permits the assembly of shapes or vessels of any size with fused, homogeneous seams throughout. The electronically "welded" seams become stronger than the material itself and cementing or taping of seams is not required, the company states. Vulcafilm can be combined with many types of fabric reinforcement while the compound itself may be varied to obtain resistance to oil, gasoline, sunlight, heat, cold, abrasion and acids. Principal use of the product to date has been in the manufacture of oil tank diaphragms as developed and sold by the Hammond Iron Works of Warren, Penna. Vulcafilm diaphragms virtually eliminate evaporation from stored petroleum products, sealing the product in and sealing air out so that evaporation and filling losses cannot take place. Other Goodrich products that have been made of Vulcafilm include inflatable pillows to prevent damage caused by the shifting of freight cargo. Inflated, these devices solidify the load. Tank liners for water cooling towers have also been made of Vulcafilm.

EC-1202 Synthetic Rubber Sealer

A versatile new fabric-reinforced black synthetic rubber sealer in ribbon form that can be used as an effective weather-proof, water-tight seal, has been announced by the Adhesives and Coatings Division of the Minnesota Mining & Manufacturing Co., Detroit, Mich. Designated as "EC-1202", the sealer is easily applied by simply laying or pressing the ribbon on one surface before riveting, screwing or bolting the second surface to the first. Adhesion properties are such that the rubber will stay in place on vertical or overhead surfaces during assembly operations. It can be stripped off and reapplied, if necessary, the company states.

Airlastic Rubber Hit by Fire

Damages estimated at $50,000 were incurred at the plant of the Airlastic Rubber Co. in Chicago, Ill., when a fire broke out on June 7. One fireman was injured in the blaze.

Marean Joins American Polymer

Morell Marean, formerly associated with E. I. du Pont de Nemours & Co., Inc., has been appointed sales manager of the American Polymer Corp. of Peabody, Mass. The appointment is part of the company's accelerated program to expand its production, research and technical service facilities. The company recently suffered an explosion in one of its plants, but production in its plants and those of its affiliate, the American Monomer Corp., have enabled the firm to compensate for the interruption of production. As part of its expansion program, American Polymer is constructing a new plant which is scheduled for completion within three months. This plant will not only increase production capacity, but will permit production of an even wider range of specialty polymers and copolymers. Pending completion of the new plant, American Polymer is making prompt deliveries from its existing facilities. Mr. Marean was graduated from the Massachusetts Institute of Technology in 1930, following which he joined the DuPont Electrochemicals Department. For the past several years he was Detroit manager for that department. In his new capacity, he will maintain headquarters at the executive and sales offices of American Polymer in Peabody.

Mohawk Enters Plastics Field

Mohawk Rubber Co., Akron, Ohio, has entered the plastics field with the establishment of a Plastics and New Products Division with headquarters at Roanoke, Va. Mohawk will produce a laminated type of polyester plastic in which the rigid material is supported by glass fiber for the furniture, radio, automotive and aircraft industries. Plastic pipe will also be manufactured. Verl M. Mershon, who has been associated with the plastics industry for the past fifteen years, has been named general manager of the Roanoke plant. Mr. Mershon was with the Goodyear Tire & Rubber Co. before joining Mohawk Rubber eighteen months ago. The company expects to begin operations at the Roanoke facility in mid-August. The factory has been leased by the company and provides 25,000 square feet of floor space with ample land for future expansion.

Emery Announces New Plasticizer

Emery Industries, Inc., Cincinnati, Ohio, has added "Plastolein 9057 DIOZ" (di-isooctyl azelate) to its line of monomeric and polymeric plasticizers. Very similar in performance to di-2-ethylhexyl azelate (Plastolein 9058 DOZ), Plastolein 9057 is a primary, monomeric plasticizer for all types of vinyls, cellulosics, and synthetic rubbers. The product is said to impart very excellent low-temperature flexibility. It is applicable to vinyl calender sheeting, calender and cast film, calender and dispersion coated fabrics, extruded products, and plastisol formulations. Plastolein 9057 DIOZ offers good efficiency and low temperature properties for nitrile and GR-S rubbers, and cellulosics, the company states.

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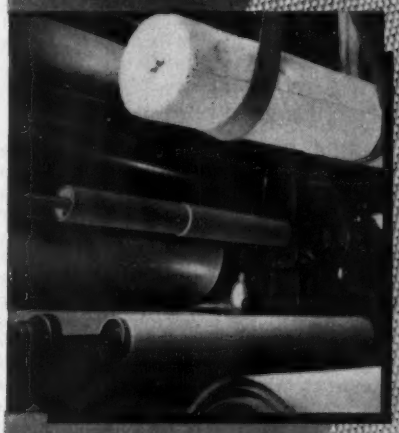

Checking evenness of sliver with linear regularity tester. One of a series of laboratory controls throughout production to assure fabric uniformity in all Mt. Vernon-Woodberry products.

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Vinyl Plastic Collapsible Tubes

A vinyl plastic collapsible tube for packaging such products as tooth paste, shaving cream and oil paints, said to be so strong that a 200 pound man can stand on it without rupturing the sides or seams, has been developed by Wallace Container Co., Los Angeles, Calif. The new product is made from Geon vinyl resin and looms in the packaging field as an economical replacement for conventional metal tubes. It weighs about one-third as much as lead containers. Cost of the new tube runs approximately the same as tin, lead and aluminum containers. Economic savings, according to Wallace, comes from nonbreakability in handling and shipping. Tubes will not burst from careless treatment or from expansion of contents caused by temperature change. The Geon vinyl tube can be made transparent, opaque, or in any color, depending on the product to be packaged. The label is printed directly on the plastic surface. Composition of the plastic can be varied to provide maximum resistance to chemicals, oils and greases contained in the packaged product. Patent coverage on the tube and all steps in the process of making it have been applied for by Wallace Container Co.

Fisk Nylon Passenger Tire

The Fisk Division of the U. S. Rubber Co. has introduced a new nylon passenger tire which is said to have up to 95% more strength than ordinary tires to resist impact ruptures and bruises. Because the nylon cords are 25% thinner than typical rayon cord, there is a saving of two pounds in weight in a 7.60-15 tire. Yet the exceptional strength of the nylon construction, the company states, gives the new "Safti-Flight" tire its great protection against breaks and bruises. The new tire is said to retain all the advanced premium features of Fisk's present Safti-Flight tires, including more than 3,000 individual safety slots across the tread, for quick stops and safe mileage. It also has sharp edges around the tire to help prevent lateral skids, and a tread that is renewable twice to give three safe levels of wear. Price levels of the nylon tire will be about 6% above the present Safti-Flights which are being continued.

Introduces New Black Bag

A new "shaped" valve-type bag for carbon black that is said to cut storage and shipping space requirements by 25% has been announced by the J. M. Huber Corp., New York, N. Y. The new bag, according to the company, permits the construction of sturdy, compact unit loads of carbon black that holds up better in transit, and are easier to unload and store than loads packed in a conventional open mouth or valve-type bag. Shaped bags are passed through a "de-airing" process that forces excess air out of each bag of black. The new 50-pound shaped bags are currently available for Wyex, Arrow, TX and Aromex grades of Huber carbon blacks. The bags will shortly be available for all other Huber grades.

British Chemists Change Posts

Two important changes in positions affecting British rubber technologists recently occurred in England. Dr. Geoffrey Gee, director of research at the Welwyn Laboratories of the British Rubber Producers' Research Association, has accepted an appointment as Professor of Physical Chemistry at Manchester University, starting with the Fall semester. Dr. Claude M. Blow, superintendent of Rubber Technical Developments, Ltd., the joint unit of the British Rubber Development Board and the B.R.P.R.A., has been appointed head of the Advisory Service on Plastics and Rubber of the British Ministry of Supply. Dr. Blow succeeds the late George L. Hammond, who died about a year ago. Dr. Gee first joined the B.R.P.R.A. staff in 1938 and held various positions with that organization before being named director of research in 1947. Dr. L. C. Bateman, formerly superintendent of chemical research for B.R.P.R.A., has been named deputy director of the association and will become director on September 1, when Dr. Gee takes up his new post at Manchester University. Dr. Bateman joined B.R.P.R.A. in 1941.

Government-Owned Rubber Burns

A warehouse in Philadelphia, Penna., which was being used to store government-owned natural rubber collapsed and burned in a fire on June 22. The blaze was finally brought under control five hours after the first of seven alarms had been sounded. There were no estimates of the amount of damage or of injuries sustained by personnel in the fire pending investigation by government agencies.

FINANCIAL NEWS

Dayton Rubber Company

Six Months to May 30: Net income of $877,271, which is equal to $1.41 a share, compared with $759,021, or $1.31 a share, in the comparable period of 1952. Sales in the six months ended May 30, 1953, totaled $29,829,547, a new company record, against $24,624,256 in the six months ended May 30, 1952.

Firestone Tire & Rubber Co.

Six months to April 30: Net income of $21,111,726, which is equal to $5.32 a common share, compared with $19,018,905, or $4.81 a share, in the six months ended April 30, 1952. Sales in the first half of the 1953 fiscal year amounted to $487,879,427, against $465,187,866 in the first six months of the 1952 fiscal year.

Union Asbestos & Rubber Co.

Quarter Ended March 31: Net profit of $69,961, which is equal to 15c a share on net sales of $2,810,588, compared with $127,564, or 26c a share, on sales of $3,302,624 in the same quarter of the preceding year.

100,000-Mile Tires Predicted

Recent figures compiled by the Automobile Manufacturers Association show that the modern automobile lasts approximately twice as long as did its predecessor of thirty years ago and yields more than four times the mileage before winding up in the scrap heap. One of the things the future will bring, according to the trade, will be tires that will last the life of the car, an average of ten years or 100,000 miles. While the lifetime tire has not as yet been produced, tire makers point out that today's tires give the motorist six times as much mileage at twice the speed as the tire of 35 years ago and costs only half as much. H. E. Humphreys, Jr., chairman of the board and president of the U. S. Rubber Co., is optimistic about the prospects for a long-life tire. The 100,000-mile tire, he said, is no pipe dream. The rubber scientists are working on it. "They already have a new kind of synthetic rubber which will last even longer than that in tires." He added that sooner than expected cars will be purchased with tires that will stay on them until the cars reach the junkyard.

U.S. Royal Full Traction Tire

U. S. Rubber Co. has announced a new U. S. Royal "Road Grader-Full Traction Tire" made without a center running rib in order to give maximum traction on harder type surfaces. The new tire also gives a full depth "bite" in the softest soils, the company states, and has a self-cleaning action in all soil conditions, because of the special lug. The open center design allows the tire to bend and conform to practically any ground irregularity so that there is constant gripping and pull. With the lugs extending beyond the center from each side, and with no center running rib, the tires have excellent traction on gravel and other hard road surfaces. A uniform rate of wear is maintained by the wide, flat tread. The special tread compound is said to resist cutting, snagging and tearing, and the bonded cords give flexibility to the carcass, and resistance to impact and bruise damage. Another feature is the heavy sidewall scuffing rib that adds to the tire's wearing qualities.

Completes Plant Addition

Velsicol Corp., Chicago, Ill., has completed a $2,000,000 addition to its plant at Memphis, Tenn., to meet increased demands for the company's chlorine products. The addition is already in full-scale production of chlorine, liquid caustic, hydrogen gas and bleach. The addition includes a salt storage and brine preparation area, a caustic preparation area, a caustic evaporation building, a rectifier installation, an expanded electrolytic cell room, and a modernized chlorine liquefaction building. The new unit will produce some 88,000 pounds of liquid chlorine, and 110,000 pounds of caustic per day, requiring 180,000 pounds of raw salt materials. The salt is moved from three 100,000-gallon storage tanks through brine purification equipment, and then into electrolytic cells for conversion to chlorine and caustic.

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CANADIAN NEWS

A process has been developed in the laboratories of the National Research Council in Ottawa, on improvements in the compounding of rubber. It relates to the production of lignin-reinforced vulcanizates having a satisfactory cure rate, together with exceptionally high tensile strength, resilience and other valuable and distinctive properties, the Council states. It has been found possible with this process to produce lignin-reinforced rubber having a tensile strength up to and over 5,000 pounds per square inch and a Bashore resilience as high as 65%. This improvement in rubber is said to be due to the presence of a new composite compounding ingredient consisting of lignin and oxides of metals such as litharge, brown lead, red lead, copper oxide and bismuth trioxide. These oxides are effective in inhibiting the cure-delaying action of the lignin and enhancing the tensile strength and resilience of a vulcanizate. In preparing the vulcanizate, co-precipitated rubber is used. Howard Smith Paper Mills, Ltd., contributed toward this research program and have rights under the patents which have been obtained. Further details and information regarding licensing arrangements may be obtained from Canadian Patents and Developments, Ltd., National Research Bldg., Ottawa, Canada.

Cabot Carbon of Canada, Ltd., officially opened its new oil furnace carbon black plant at Sarnia, Ont., on June 25. It is expected that the new $3,000,000 installation will produce 25,000,000 pounds of oil furnace blacks annually. The company uses a method of production which is based on a process providing for the controlled combustion of preheated oil charge in special reactors, with combustion air supplied under blower pressure.

The actual plant arrangement provides for two parallel units of production equipment, each unit comprising reactors, cooling tubes, gas coolers, and complete collection equipment, including bag filters. Facilities include a modern laboratory, office building, materials service and storage building, large warehouse and black storage building.

Several recent personnel changes have been made by the Polymer Corporation at Sarnia, including the following: I. C. Rush has been named assistant superintendent of the Technical Division. D. J. McCracken has been placed in charge of a new section on equipment development in the Research and Development Division. W. A. Gilchrist, formerly with Dominion Rubber in Kitchener, has joined the company as a research chemist. All laboratories of the Technical Division have been merged into a single laboratory department under the supervision of E. A. Crockett as chief chemist.

A. Beverley Lewis

named vice-president of the British Rubber Co.

A. Beverley Lewis has been appointed vice-president and a director in charge of development of the British Rubber Co., Ltd., Montreal, a division of Mailman, Ltd. Mr. Lewis is a graduate of the University of Toronto in chemical engineering and until recently was associated with the Armstrong Cork Co. of Canada, Ltd., as factory manager at Montreal.

G. H. Thompson, formerly associated with the B. F. Goodrich Rubber Co. of Canada, Ltd., has joined the staff of the Kaufman Rubber Co., Ltd., in Kitchener.

"Thru-Way 125" Truck Tire

Seiberling Rubber Co., Akron, Ohio, has introduced the "Thru-Way 125," a new, "air-conditioned" truck tire. Said to run as much as 60° F. cooler than other types used in the trucking industry, the tire has a number of heat vents in the shoulder which help to dissipate the heat. In addition to cooling, these heat vents break up a shearing action on the rubber caused by the impact of the tire on the highway surface, thus also increasing wear-resistance, the company states. The "Thru-Way 125" is being produced in different sizes and is being marketed at prices competitive with conventional premium truck tires.

Processing Italian Pumice

Having recently sold its pumice operations at Grants, N. M., operated by its subsidiary, the Pumice Corp. of America, Whittaker, Clark & Daniels, Inc., New York, N. Y., is now importing specially selected crude pumice from Italy for grinding and processing at its new plant in South Kearny, N. J. A large inventory of the crude ore is maintained at South Kearny, to insure uninterrupted production and shipment.

G-E Silicone Rubber SE-360

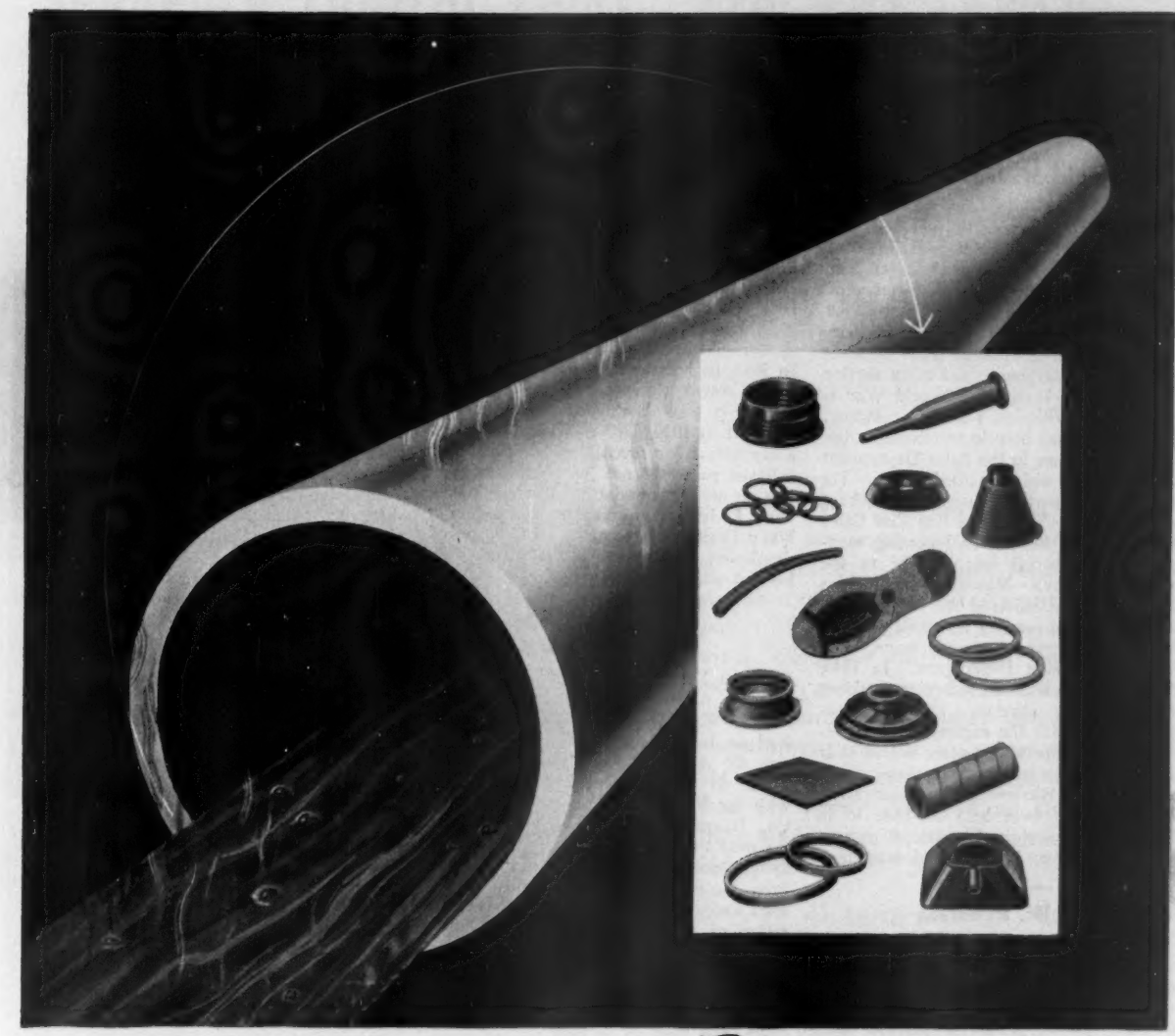
The Silicone Products Department of the General Electric Co., Waterford, N. Y., has announced that silicone rubber parts can now be produced in molds originally designed for natural and synthetic rubber through the development of a low compression set silicone rubber with only half the shrinkage after molding of conventional silicone rubber compounds. Recommended particularly for capacitor bushings and for O-rings and packings in engines where gaskets and seals must remain effective under sustained pressure, the new compound, "SE-360", has a compression set of only 8% after 22 hours at 300° F. as compared with nearly 100% for organic rubber and about 75% for general purpose silicone rubber. Its water absorption is an unusually low 1% after immersion for one week at 70° C. It has a total linear shrinkage of 3% after oven cure. Similar compounds generally shrink 6% or more, the company states. This low shrinkage feature is expected to effect a saving in the amount of compound required. Conventional press cycles of about 15 minutes at 250° F. can be used, followed by a 24-hour oven cure at 480° F. to obtain the manufacturers' stated physical properties. SE-360 is currently available as a 60 durometer compound. It can be used as a base stock and modified by rubber fabricators to yield 70 to 80 durometer compounds.

Heyden "Superfyde" Formaldehyde

Heyden Chemical Corp. has developed a new solid form of formaldehyde, with less than one-tenth of one per cent water content, under the trade name "Superfyde", and is now producing the new product in commercial quantities by a special process. Company officials stated that this new product has advantages for processes in the rubber, plastics, textile and other industries which call for formaldehyde, but where the presence of water inhibits or prevents reaction. Superfyde, which is somewhat similar to paraformaldehyde in chemical structure, but has a higher molecular weight and higher melting point, is suggested for a variety of uses in applications where paraformaldehyde and other types of formaldehyde are not well adapted. The product is also of special interest as a source of dry formaldehyde in the manufacture of chemical intermediates and resins, the company stated.

Gates Club Holds Meeting

The recent monthly meeting of the Gates Rubber Co. Technical Club held in Denver, Colo., was addressed by Ray McBrian, engineer of research and standards of the Denver, Rio Grande & Western Railroad. Mr. McBrian spoke of the electron microscope and its use in the routine analysis and control of fuels and lubricants. He also spoke of the uses of the instrument in the rubber industry. Rubber manufacturers, he said, might be interested in the electron microscope as it relates to such things as dispersion patterns involved in the use of various fillers and other ingredients, particle size correlations, and reinforcements.



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OBITUARIES

David M. Hastings

David M. Hastings, manager of the Western Hemisphere Division of the Goodyear Tire & Rubber Export Co., died in City Hospital in Akron, Ohio on June 14. He was 57 years old. A member of the Goodyear organization for more than 33 years, he joined the company in 1920, three years after graduation from the University of Pennsylvania, and after service with the U. S. Marines in World War I. During his association with the company, Mr. Hastings had been in merchandise distribution and later in the Sales Department in New York and Hartford, Conn. He joined the export company as assistant manager of the Truck and Bus Tire Sales Department in 1929, later becoming manager. He returned for a while to the parent company's Manufacturers' Sales Department, but rejoined the export company in 1936 as head of its truck and bus tire sales. He was next made manager of the Merchandising Department. In 1940, Mr. Hastings was named vice-president and managing director of Goodyear-Argentina. With the expansion of Goodyear's foreign operations after World War II, Mr. Hastings was made manager of the newly-created Western Hemisphere Division. Services were held on June 16 in Akron with burial in Glendale Cemetery. He is survived by his wife and daughter.

R. W. Eckstein

R. W. Eckstein, manager of tank lining sales in the Industrial Products Division of the Goodyear Tire & Rubber Co., died recently in Akron, Ohio, after an illness of nearly two months. He was 46 years old. Mr. Eckstein joined Goodyear in 1928 and had been with the company since. A native of Gallion, Ohio, he started with the company in the factory. Later, he joined the company's Training Squadron, following which he entered tank lining sales as a clerk in 1938. He became assistant manager of the department in 1946, and later the same year was elevated to the department managership. He was a Mason and a member of the Executives Club of Akron. His wife and son survive. Funeral services were held in Akron with interment in Rose Hill Cemetery.

Richard P. Carlton

Richard P. Carlton, retired president and vice-chairman of the Executive Committee of the Minnesota Mining & Manufacturing Co., St. Paul, Minn., died recently in that city. He was 59 years old. In ill health for the last year, Mr. Carlton had stepped down from the presidency in May of this year. He began with the company as a laboratory assistant and became a vice-president and director in 1929. In 1948, he was made executive vice-president and director of manufacturing, engineering and research.

Theodore Whittelsey, Sr.

Theodore Whittelsey, Sr., former director of the Central Research Laboratory of the U. S. Rubber Co., died on June 26 in Philadelphia, Penna. He was 85 years old. He had retired from the company in 1920. Dr. Whittelsey joined U. S. Rubber in 1909, having previously taught chemistry at Cornell and Northwestern Universities. In 1913, he became head of the company's first Central Research Laboratory, then located in New York City. After his retirement in 1920, Dr. Whittelsey acted as a consultant for several companies. Many colleges presently use a book written by him on qualitative analysis. During World War I, he was a civilian adviser on a Navy Department committee in charge of developing gas masks. He is survived by his son and two daughters.

Milton Kutz

Milton Kutz, formerly assistant general manager of the Electrochemicals Department of E. I. du Pont de Nemours & Co., died on June 16 in Wilmington, Del. He was 69 years old. Mr. Kutz began his career in the chemical industry in 1897 with the Roessler & Hasslacher Chemical Co., Niagara Falls, N. Y., rising during the next thirty-three years from office boy to vice-president and a director of the firm. Upon the merger of that company with DuPont in 1930, Mr. Kutz became director of sales. When the company was established as the R. & H. Chemicals Department in 1933, now the Electrochemicals Department, Mr. Kutz was named assistant manager of the new department. He retired from DuPont in 1946.

H. W. Schultz

H. W. Schultz, associated with the Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., Canada, for thirty-five years, died on May 2. He originally joined the company in the Sales and Credit Departments and in the early 1920's assumed the management of the Purchasing Department. In 1932, he was appointed to organize oil company sales relations. During World War II, he served with the Canadian War Price and Trade Board, and since the war has been engaged in purchasing work for the company. Mr. Schultz was well-known in the rubber and chemical trade in both the United States and Canada.

Mrs. Nelson Goodyear

Mrs. Katherine Goodyear, widow of Nelson Goodyear, inventor of oxyacetylene welding and lighting equipment, and granddaughter of Charles Goodyear, died on June 4 after a long illness. She was 72 years old. She is survived by her son and daughter.

Harry H. Bridgwater

Harry H. Bridgwater, founder and president of the Bridgwater Machine Co., Akron, Ohio, died in his sleep at his home in Silver Lake on June 22. His family had spent the previous day helping him celebrate his 87th birthday which would have been June 24. Born in Birmingham, England, Mr. Bridgwater came to the United States in 1894. Two years later, he opened a modest machine shop in Akron with six or seven employees. Originally, Bridgwater Machine Co. made molds for tires, but rapidly expanding Akron industry and two world conflicts kept the firm busy expanding and undertaking new machine tasks. Today, the company employs more than 600 persons. While still acting as president of the company, Mr. Bridgwater had delegated most of his responsibilities to his sons, Boyd, vice-president and general manager, and John, secretary-treasurer. Another son, E. R. Bridgwater, is sales director of the Rubber Chemicals Division of E. I. du Pont de Nemours & Co. Mr. Bridgwater was a Mason. Besides his three sons, he is survived by his wife and daughter. Funeral services were held on June 24 in the Degnon Funeral Home in Stow, Ohio, with burial in Oakwood Cemetery, Cuyahoga Falls, Ohio.

Sumner Simpson

Sumner Simpson, chairman of the board of Raybestos-Manhattan, Inc., died on June 13 in Bridgeport, Conn. He was 79 years old. Born in Pittsburgh, Penna., Mr. Simpson began his career in industrial management with the Westinghouse Corp. He came to Bridgeport in 1907 as assistant to the works manager of the Union Metallic Cartridge Co., now part of the Remington Arms Co. After having joined the Belknap Manufacturing Co. as secretary, he jointed Raybestos in 1911 and served as its president until 1929. In that year, Mr. Simpson brought together four concerns engaged in the manufacture of rubber and asbestos to form Raybestos-Manhattan, Inc. These were the Manhattan Rubber Co. of Passaic, N. J.; U. S. Asbestos Co. of Manheim, Penna.; General Asbestos & Rubber Co. of Charleston, S. C., and Raybestos itself. He was president of the combined concern until 1948, and thereafter served as chairman of the board. He was the first president of both the Community Chest and the Rotary Club of Bridgeport, past-president of the Union League Club of New York and served on many charitable and civic boards. He is survived by his son and daughter.

Sidney Vere Smith

Sidney Vere Smith, chairman of the board of the Binney & Smith Co., died on June 11 in Roosevelt Hospital in New York City. He was 61 years old. Mr. Smith was also a director of the Columbian Carbon Co. He was a member of the Union League Club. Funeral services were held on June 15 at the Christ Episcopal Church in Greenwich, Conn. He is survived by his wife and two daughters.

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NEW GOODS

MSA Shallow Diving Apparatus

Through the development of the "MSA Shallow-Water Diving Apparatus," produced by the Mine Safety Appliances Co., Pittsburgh, Penna., a pool or beach employee can stay down an hour in water as deep as 35 feet in order to perform maintenance functions. The diving apparatus consists mainly of a rubberized fabric vest, a high-pressure oxygen cylinder, a canister to remove carbon dioxide exhaled by the user, and a facepiece. With this "re-breathing" apparatus the wearer can work at his "housekeeping" activities in comfort and safety. The full facepiece allows wide visibility while

its in-turned lip excludes water. The diver controls the oxygen flow with a needle valve and sets it for constant flow or to admit only a small amount every few minutes. Weights on a belt keep the diver and apparatus down, but may be quickly jettisoned. Part of the vest is a flotation chamber which may be instantly inflated with a carbon dioxide cartridge or blown up by the diver's breathing through a tube. The photograph shows an employee at Idlewild Park Pool in Ligonier, Penna. Wearing the shallow-water diving apparatus she wields a long-handled broom and an underwater vacuum cleaner to keep the pool bottom clean.

Commander Air Hose

A new heavy duty air hose suitable for working pressures up to 400 pounds per square inch has been announced by the B. F. Goodrich Co. Called the "Commander," the hose is reinforced with a single braid of high tensile steel wire and is said to be more flexible than other types of heavy duty air hose. According to Goodrich, the hose is designed for rugged service in mines, quarries, construction projects and general industrial use where high working pressures are required or where the hose cover is subjected to severe abrasion. An oil-resistant hose tube permits tools to be oiled through the hose. A light gray oil-resistant cover increases visibility of the hose for mining use. The Commander is manufactured in ½, ¾ and 1-inch sizes.

Martin Rubber Treasure Chest

Martin Rubber Co. of Long Branch, N. J., is marketing its "Treasure Chest," consisting of "King Neptune" swimming fins and swim mask. A set can be obtained to fit either children or adults. The masks and fins are available in a variety of colors, and are made with non-

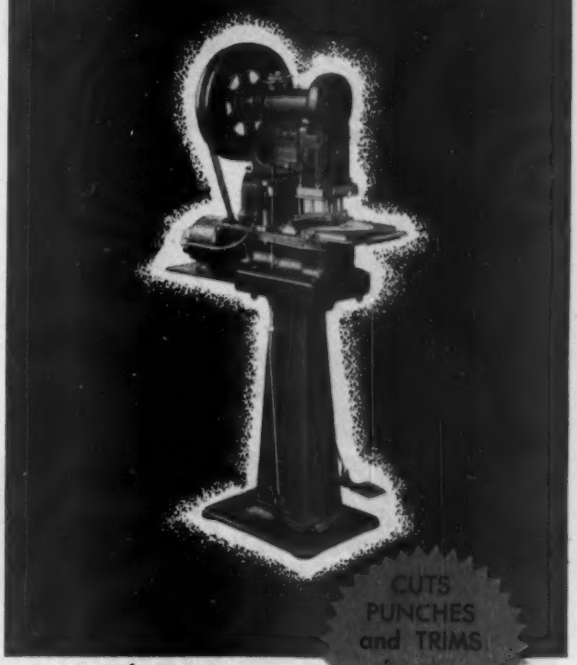
rust brass fittings and natural gum rubber. The King Neptune swimming fins are designed for 50% more speed while swimming, and the straps are molded to fit comfortably. The King Neptune Masks have unbreakable lenses and are adjustable.

"SOBO" Adhesive in Squeeze Bottles

Slomons Laboratories, Inc., Long Island City, N. Y., is packaging its versatile new adhesive "SOBO" in polyethylene squeeze bottles. This is said to be the first time that adhesives have been put up in the handy polyethylene containers. Besides the plastic bottle, SOBO is also packed in collapsible tubes, pints, quarts and gallon containers. SOBO is said to be ideal for adhering, laminating and flocking. It is non-inflammable, non-toxic, quick-drying, flexible, and drys neutral. The product is said to produce an unusually strong bond. Materials treated with the adhesive may be dry cleaned, according to the manufacturer.

SEE PAGE 446

a factory in a foot of space!



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Plush Toys With Vinyl Faces

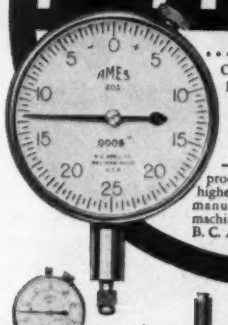
Gund Manufacturing Co., New York, N. Y., is producing a new line of plush toys with faces realistically colored and shaped of skin-textured Vinylite plastics. The new line of toys have eyes that open, close and even wink. Toys in the line include a wire-haired terrier, a "Regal Beagle" dog that barks when his ear is squeezed, a Scotch terrier, spaniel, small leopard and tiger, all

with faces molded of Vinylite plastic. Additional items are various small bears with nose, face or complete head made of Vinylite. The largest toy in the line is "Boobsy Bear," with face, hands and feet of Vinylite as shown above. "Boobsy Bear" is accompanied with her baby bear. Resistant to stains and easily washed, the Vinylite plastic of which the animal faces are made also resists cracking, peeling and abrasion.

Rubber-Jacketed Power Cable

An all-weather, rubber-jacketed electric power cable for Arctic use has been developed by the Engineer Research and Development Laboratories, Fort Belvoir, Va. The new military cable, which also operates successfully under tropic and temperate conditions, remains flexible as low as —65°F. It does not become brittle at low temperatures nor as stiff as commercial cable, according to the Laboratories which developed the cable in cooperation with the Synthetic Rubber Division of the Reconstruction Finance Corporation. As the result of extensive tests an elastomer composed of approximately 87 parts butadiene and 13 parts styrene and combined at 122°F. was selected for cable use. It is known as GR-S 1023 and is now being used commercially to some extent where low temperature applications are involved. In the long-range investigations now under way, studies are being made on the effect of long storage on low temperature characteristics; the effect of various compounding ingredients such as fillers, reinforcing pigments and plasticizers, and the effect of the state of cure. The goal is a cable which in addition to the all-weather characteristics of the new cable will give better resistance to weathering, ozone and oil.

AMES



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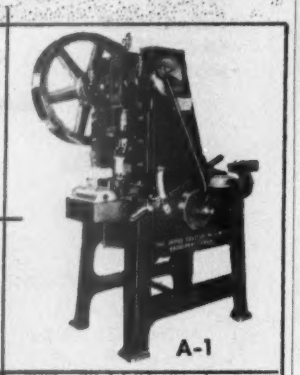

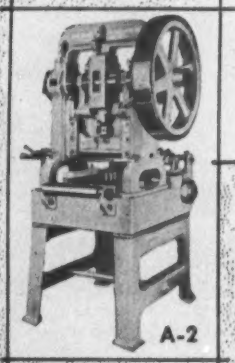

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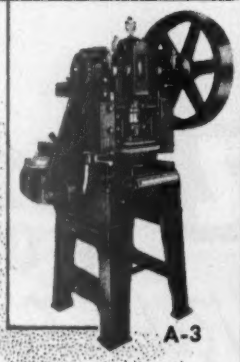
MODEL A-2
Cutting Multiple Heels, Half and Full Soles with stock grain.

MODEL A-2s
(Not illustrated)
Cutting across grain of stock.

MODEL A-3
Cutting Multiple Heels and Taps with or across stock grain.



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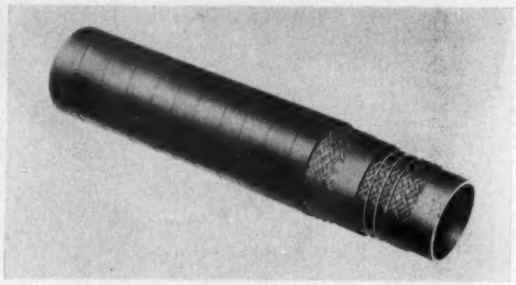
Revolc Water Suction Hose

A new horizontal braided water suction hose, "Revolc Water Suction Hose," has been developed by the Quaker Rubber Corp., division of the H. K. Porter Co., Inc., Philadelphia, Penna. The new hose is especially designed for both pressure and suction handling of water. It is reinforced with two layers of braided rayon cord, plus a helix of high tensile spring steel wire. The layers of reinforcement are separated by a layer of rubber friction to eliminate internal chafing of the reinforcing cords and wire. The result is a hose that is light in weight, will not kink or collapse, maintains full opening in any position, and can be grounded to eliminate static electricity. This hose is similar to Chernek type suction hose, except that it is 50% more flexible, is stronger, and can be coupled with any type of suction or water hose coupling, the company states. The hose is available in 1¼-inch to 3-inch inside diameter sizes.



Vinyl Plastic Squeeze Toys

Colorful, soft plastic squeeze toys, which won't fade or be damaged if sterilized in boiling water, are being made by Molded Latex Products, Inc., of Paterson, N. J. A perky little penguin clutching an ice cream cone, and a wide-eyed hen are now being produced by the company. Both are made from Marvinol vinyl resins. Vinyl is being used, according to Molded Latex, because it has a warm feel; it molds easily; it has a smooth surface that takes bright colors, and can easily be cleaned with soap and water or by sterilizing in boiling water. The penguin, hen, and other squeeze toys made by the company, are designed as playthings for infants up to two years.

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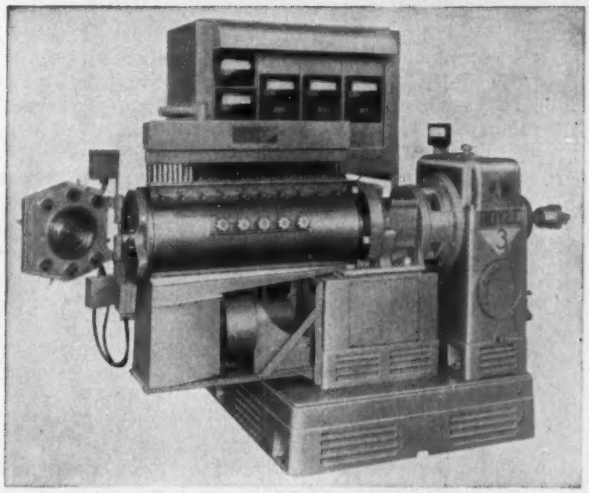

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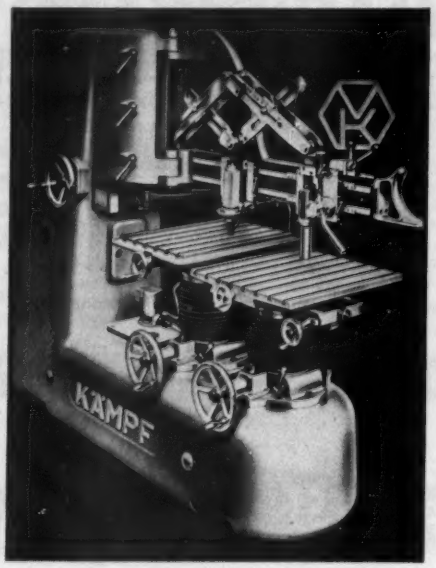
NEW EQUIPMENT

Kampf Duplicating Milling Machine

The Kampf duplicating or mold-copying milling machine made by Michael Kampf K.G. of Frankfort, Germany, which is widely used throughout Europe, is now available in the United States through Rene Boas and Associates, 92 Liberty St., New York 6, N. Y. This general, all-purpose pantograph can be used for the manufacture of vulcanizing molds, dies,

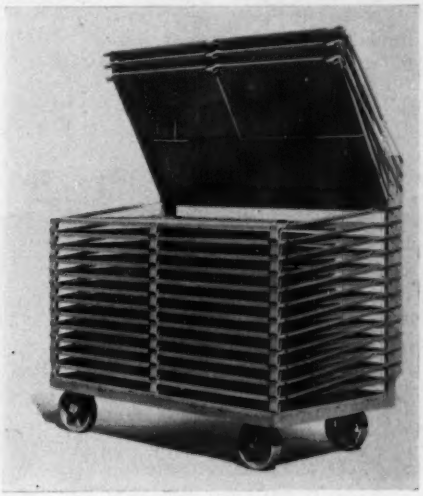


tools and the refining of difficult single parts with irregular surfaces. In contrast to the usual design of pantograph-controlled profile milling machines, which utilize a horizontally free-swinging pantograph as the carrier of the milling spindle and former pin, the hinge points of which are in a vertical position, the Kampf unit features a patented vertical arrangement of the pantograph.

According to the manufacturers, the vertical arrangement featured on the Kampf machine offers the following advantages: The swivelling arm, bearing the pantograph with the milling spindle held exactly vertical in cross slides and the duplicating pin held in the same manner, absorbs a great part of the cutting pressures which arise. This vertical guidance is achieved without any additional guide elements provided with joints and makes it possible to mill perfect steep flanks, which is not always possible with horizontally-arranged pantographs. Due to the careful dimensioning of the swivel bearings and the critical sections of the arm, pitching or vibrating is eliminated, even with maximum cutting pressures applied. Elimination of pitching or vibrating preserves the freedom of play of the adjustable bearing of the pantograph swivelling points, which assures accurate duplication and long service life of the machine itself. The pantograph is adjustable within limits of reduction in size from 1.5 to 4 times.

Palmer-Shile Book Rack

Designed for use by manufacturers for drying or curing sheets or where parts must be separate, a new book rack has been introduced by the Palmer-Shile Co., 12602 Mansfield, Detroit 27, Mich. The shelves on the new rack can be raised or lowered easily and are auto-

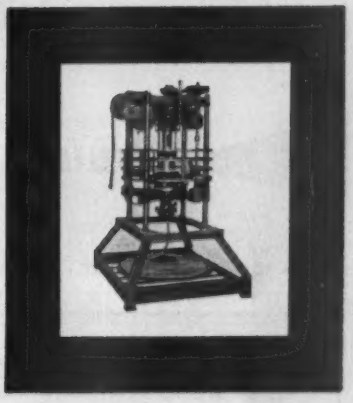


matically held in position by sturdy extension springs. The shelves are made to specifications, with specific distance between each one, and are constructed to carry the required weight. Each truck is supplied with the number of shelves needed. The new racks can be made for handling by lift trucks or wheeled by hand. They can be equipped with either metal or rubber-tired wheels.

Wheel-mounted fluoroscopic units produced by the X-Ray Department of the General Electric Co., Milwaukee 14, Wisc., are said to offer considerable promise for application in such fields as rubber and plastics products.

SEE PAGE 446

High Speed Hose Reinforcement



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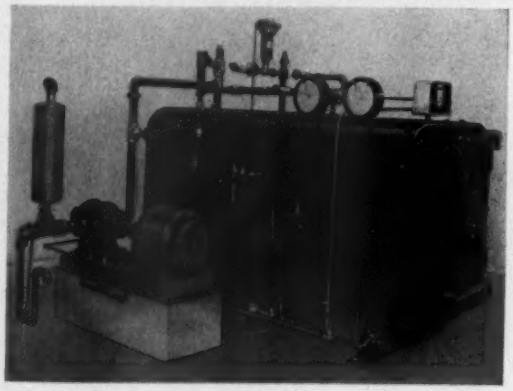
Combination Steam-Carboxide Sterilizer

Sterilizers using steam or hot air as the sterilizing agent have been used for many years by hospitals for sterilizing such rubber products as gloves and tubing. Recent developments in drugs and materials which are heat and moisture sensitive have made sterilization by steam or hot air undesirable, and to meet these conditions the American Sterilizer Co. of Erie, Penna., devised a cold process which utilizes Carboxide gas, which is composed of 90% carbon dioxide



and 10% ethylene oxide, as the sterilizing agent. Cold sterilization makes it possible to sterilize such heat-sensitive safety equipment as goggles and masks. The pharmaceutical industry utilizes the procedure in sterilizing rubber stoppers and closures.

To meet still wider application, American Sterilizer has now introduced a combination steam-Carboxide sterilizing unit. This unit, which is illustrated herewith, may be operated at 25 to 27 pounds gas pressure for Carboxide sterilization or at 15 to 17 pounds (250° to 254°F.) for steam sterilization or as a combination unit employing Carboxide gas in the chamber and steam in the jacket. The latter method is said to shorten the exposure periods because of the temperature coefficient of the gas and its more rapid diffusion at higher temperatures. Like other units made by the company, the new combination sterilizing unit is equipped with a special safety door. Pressure in the chamber engages a powerful locking clutch in the door which mechanically prevents rotation of the handwheel, necessary to release the locking arms. The clutch will release only after pressure is exhausted.

Designed to meet the needs for a smaller, more simplified and less expensive unit suitable for handling 5 and 6½ gallon containers, the new **GS No. 49 Tilter,** produced by the General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 32, Penna., prevents accidents caused by spilling, splashing and carelessness in pouring liquids.

A **multi-purpose fork truck** designed for placing and removing dies from presses, and equipped with forks, a boom, and die-pulling equipment, has been introduced by the Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio.

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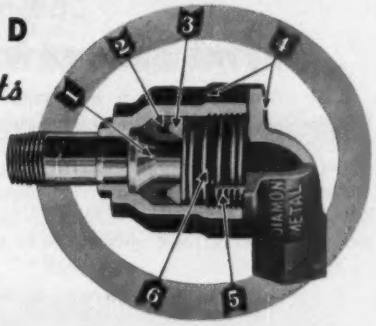

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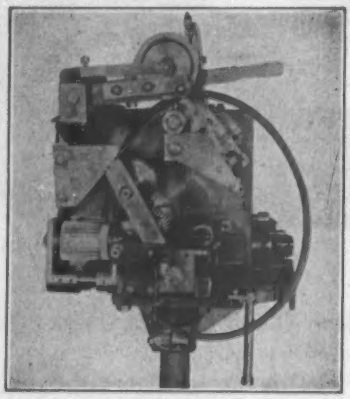

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Improved Disperser and Homogenizer

The availability of an improved model of its Tri-Homo Disperser and Homogenizer has been announced by the Tri-Homo Corp., 190 Highland Ave., Salem, Mass. The new model is furnished with a variable speed motor drive, permitting operating speeds from 2500 to 25,000 rpm. According to the company, the purpose of a variable speed unit is to fill the industrial

demand for a mill to handle a wide range of products since a fixed speed mill is usually suitable only for limited uses. The new Tri-Homo unit can be used for any type of liquid or paste type product, excluding dry powders, that requires particle size reduction, grinding, dispersing, milling, emulsifying, homogenizing, wetting or blending together.

Generally, light viscosity compounds containing a small quantity of pigment, fillers, etc., offer no particular milling problem, but heavily viscous compounds, with little moisture, are not easily dispersed with a high speed mill. The new Tri-Homo unit can handle all these compounds with the worm impeller and the correct milling speed can readily be obtained by means of convenient levers on the machine. The particle size of the product is also easily obtained by means of a convenient hand adjuster, which is of the micrometer type and which is graduated in thousandths. Even micron particle sizes are produced. Overheating is eliminated with correct speed and the water cooling jacket. Special types of rotors and stators are supplied by the company to meet the needs of each specific industry.

The new model, illustrated herewith, is a heavy-duty machine, but it can be conveniently mounted on a bench or table and does not require any bolting down.

Jones Motrola Corp., Stamford, Conn., has developed a new **speed monitor** which applies the highly accurate and dependable principle of the mechanically-operated tachometer, which is unaffected by heat, moisture, magnetic currents or other limiting factors, to indicate speed. In addition to providing accurate, direct indication of speed, the new monitor also provides a means for intricately controlling speed within maximum and minimum limits, can actuate relays and solenoids to shift gears, act as an overspeed or over-load control, etc.

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REVIEWS

BOOKS

Chemical Process Machinery: 2nd Edition. By E. Raymond Riegel. Published by Reinhold Publishing Corp., 330 West 42nd St., New York 36, N. Y. 6 x 9 in. 736 pp. $12.50.

The first edition of this work was published in 1944 under the title of "Chemical Machinery." Because it was a show window for the remarkable resources of machinery and equipment designed, developed and, to a certain degree, perfected for services in the chemical industries, it met with instant favor and wide circulation. The new, greatly enlarged edition brings the material of the previous volume abreast of latest developments and scores of new diagrams, photographs and tables make the construction and operation of recently employed machinery readily understandable to students and laymen as well as to engineers. As with the previous edition, the classification of the equipment by function gives the discussion a natural and logical organization.

Listing only equipment which is commercially available, the new edition describes and illustrates such new devices as multispheres and multicylinders, high-speed centrifugal separators, continuous crystallizers, absorption refrigerators, molecular stills, turbo-driers, etc. New material is included on distillation, the mixing of liquids, and instruments for the control of chemical processes. Expanded descriptions appear on evaporators, driers, heating and cooling equipment, pumps, and similar equipment. There are 27 chapters in all, three of which are devoted to instrumentation, and a subject index.

•

Ion Exchangers in Analytical Chemistry. By Olof Samuelson. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 6 x 9 in. 291 pp. $6.50.

Ion exchangers are currently being used to produce more reliable analytical results, to find new methods for analyzing technical products and substances, to purify analytical reagents, to recover valuable reagents, and for analytical separations. How the ion exchange method is used for these and other purposes is the function of this book, said to be the first of its kind issued. The book is divided into three major parts, the first devoted to a thorough discussion of the fundamental properties of ion exchange resins, ion exchange equilibria, and kinetics; the second to a treatment of the techniques of simple ion exchange separations for analytical purposes and ion exchange chromatography, and the third to practical applications in organic, inorganic, and biochemical analysis. Additional sections investigate the complex salts and miscellaneous applications not treated elsewhere in the text.

•

Synthetic Organic Chemistry. By R. B. Wagner and H. D. Zook. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 6 x 9 in. 887 pp. $11.50.

This book is designed to summarize in a single volume methods of organic syntheses most frequently employed in the preparation of mono- and di-functional compounds. The methods are collected in chapters each of which is devoted to the formation of compounds containing a particular functional group or related groups. In order to present a wide coverage of organic chemistry, detailed discussions have been omitted, but frequent references to the original literature as well as to other books and review articles are included. The index has been prepared with particular emphasis on the reactions of organic compounds, but in the interest of economy the compounds listed in the numerous tables are not repeated in the index. To compile the data, the authors reviewed some 20 chemical journals, combing the issues page by page from 1919 to 1950, inclusive.

Standards on Plastics. Published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. 6 x 9 in. 705 pp. $5.25 (in heavy paper cover).

This book gives a large number of standards, including specifications, definitions and tests for a wide range of plastics. Most of the 135 standards which are included have been developed through the work of ASTM Committee D-20 on Plastics. The committee for many years has been perfecting methods of testing, and those included are considered to be the best available at this time. In addition to the standards covered by Committee D-20, there are a number that are pertinent from other fields, including electrical insulation. The 27 specifications cover quite a wide range of molding compounds such as phenolic, polystyrene, melamines, ureas, cellulose, acetates, vinyl chloride, methacrylate, and materials made from these compounds in the form of sheets, rods, tubes and shapes. The large number of test methods are arranged in the following classifications: strength properties; hardness properties; thermal properties; optical properties; permanence properties; analytical methods for plastics; molds and molding processes for plastics; conditioning of plastics; plates, sheets, tubes, rods, and molded materials; and electrical tests. Other section headings in the book include definitions and nomenclature, conditioning of plastics, miscellaneous subjects and appendices.

•

Organic Reactions: Vol. VII. Edited by Roger Adams. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 6 x 9 in. 440 pp. $9.00.

The latest volume in this series continues the collection of chapters each of which is devoted to a single reaction, or a definite phase of a reaction, of wide applicability. This series is intended to fill the gap left by many textbooks and laboratory manuals devoted to organic chemistry which usually furnish numerous examples of the application of various syntheses but only rarely convey an accurate conception of the scope and usefulness of the processes. The current volume contains seven chapters, each contributed by outstanding authorities, as follows: (1) The Pechmann Reaction; (2) The Skraup Synthesis of Quinolines; (3) Carbon-Carbon Alkylations with Amines and Ammonium Salts; (4) The von Braun Cyanogen Bromide Reaction; (5) Hydrogenolysis of Benzyl Groups Attached to Oxygen, Nitrogen or Sulfur; (6) The Nitrosation of Aliphatic Carbon Atoms; (7) Epoxidation and Hydroxylation of Ethylenic Compounds with Organic Peracids. Like previous volumes, the current one includes a subject index, with bold face page numbers used to indicate experimental procedures.

SEE PAGE 446

ATLAS-OMETERS

. . used in Quality Control for plastic or rubber products at B. F. Goodrich Company

An important part of the tests at B. F. Goodrich Company Laboratories involves subjecting products to the destructive effects of weathering conditions they will be expected to meet in service. By using Atlas Fade-Ometers and Weather-Ometers it is often possible to obtain quickly, in advance of actual service, assurance that new materials will have satisfactory resistance to cracking, sun-checking, chalking, fading or bleeding of color, or to loss of elastic properties.

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Technical Bulletin on request

BOOKLETS, CATALOGS, etc.

Barrett Tar Bases. Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. 8½ x 11 in. 96 pp.

Coal tar chemicals are weakly alkaline hydrophilic liquids having aromatic characteristics and industry has long taken advantage of these characteristics in the manufacture of a variety of end products. Some of the newer applications of these materials are indicative of the fact that the potentialities of tar bases and their derivatives are only beginning to be realized. For example, pyridine, the simplest member of the group of chemicals derived from coal tar, was originally used almost exclusively as a solvent, but now most of the pyridine produced is used for its reactive and chemical properties, particularly in the textile field. Another example is the spreading use of tar bases for stabilizing the chlorinated solvents used in the degreasing of metal parts. Recognizing this trend, Barrett has issued this booklet to stimulate interest in the new potentialities of tar bases. The booklet covers uses of tar bases in specific industries, properties of pure tar bases, typical reactions, hazards and methods of handling, and test methods.

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Alum—Commercial Aluminum Sulfate. Industrial Chemicals Division, American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. 6 x 9 in. 44 pp.

This booklet describes aluminum sulfate, its history, manufacture, properties and uses. Illustrated with charts and graphs, the booklet explains what aluminum sulfate (alum) is, and outlines its numerous industrial applications. Sections of the booklet include: What is Alum; History of Alum; Manufacture of Alum; Properties of Alum; Alum in the Treatment of Municipal and Industrial Water Supplies; Alum in the Treatment of Sewage and Industrial Wastes; Alum in the Paper and Other Industries; Alum Handling Systems, and Cyanamid Alum.

•

Physical Properties of Synthetic Organic Chemicals. (1953 Edition). Carbide and Carbon Chemicals Corp., 30 East 42nd St., New York 17, N. Y. 8½ x 11 in. 20 pp.

The latest edition of this booklet presents data on more than 320 synthetic organic chemicals, arranged by family groups for easy reference. Condensed data on applications is given while physical properties are shown in tabular form. This year, for the first time, the booklet includes a section on 56 new research chemicals available from the company, among them being synthetic alpha-picoline, diethoxy tetrahydrofuran, and four new vinyl monomers.

•

Organic Chemicals. Shell Chemical Corp., 50 West 50th St., New York 20, N. Y. 8½ x 11 in. 92 pp.

Generously illustrated, this brochure describes the properties, specifications and applications of the company's solvents, industrial chemicals, resins and plastics. In connection with these, there is a full section describing the facilities of the company's technical service laboratory in Union, N. J. A special section describes the anhydrous ammonia fertilizers which the firm sells. The catalog concludes with a description of the concern's national distribution system.

•

Blaw-Knox Autoclaves. (Catalog 2413). Process Equipment Department, Blaw-Knox Division of the Blaw-Knox Co., Blawnox, Penna. 8½ x 11 in. 48 pp.

This catalog explains the safety measures taken by the company to insure safe operation of the autoclaves by purchasers. Various possible heating systems are discussed and their advantages set forth. Also covered in the catalog are materials of construction, types of agitation, stuffing boxes and instrumentation. The catalog is profusely illustrated with photographs and drawings.

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REVIEWS (CONT'D)

QO Furfuryl Alcohol. (Bulletin No. 205). Chemical Dept., Quaker Oats Co., Merchandise Mart Plaza, Chicago 54, Ill. 8½ x 11 in. 28 pp.

This booklet contains information on commercial handling, physical data, chemical reactions and established uses of furfuryl alcohol. Divided into five main sections, the booklet contains over ten pages of easy-to-read charts and tables. The opening chapter traces the history of the product and gives much information about its production and availability. Chapters two and three include physical data tables and discuss the chemical and physical properties. The many uses for furfuryl alcohol are described in the fourth section of the booklet. The fifth and last chapter is an appendix which discusses such things as the specific gravity and pound per gallon of furfuryl alcohol at various temperatures, density of furfuryl alcohol-water solutions as a function of composition, and solubility of various gums, resins, and plastics in furfuryl alcohol.

•

Aldehydes. (Catalog No. F-5278). Carbide and Carbon Chemicals Co., 30 East 42nd St., New York 17, N. Y. 8½ x 11 in. 40 pp.

This booklet discusses in detail the fourteen aldehydes that are now sold in commercial quantities by the company. Information on other aldehydes that are available in research quantities is also included. The booklet has been prepared as a handy reference for people in the chemical industry: chemists, engineers, purchasing agents, and production and laboratory workers. Uses and suggested applications for the aldehydes, their physical properties, shipping data, specifications, test methods, constant-boiling mixtures, and a list of selected references to aldehydes in the technical literature are included. Aldehydes find diverse applications in the production of rubber, protective coatings, textiles, paper, washable wallpaper, pharmaceuticals, dyes, etc.

•

Titeflex and Uniflex Flexible Metal Tubing. (Catalog No. 200). Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J. 8½ x 11 in. 48 pp.

The company's helically-wound flexible metal hose and Uniflex helically-corrugated flexible metal hose are illustrated and described in this catalog. In addition to complete descriptions and specifications for flexible metal hose, fittings and assemblies, the catalog contains ordering information. Featured in a section on engineering data are charts showing frictional losses versus flow rates for various sizes of metal hose and conduit. Complete information on installation and maintenance of metal hose is also included. Also featured is a completely illustrated story showing how seamed metal hose is manufactured, from metal strip to complete assembly. Other photographs show production, laboratory and testing facilities.

•

Hycar Polyacrylic Rubber. (Service Bulletin H-11). B. F. Goodrich Chemical Co., 324 Rose Bldg., Cleveland 15, Ohio. 8½ x 11 in. 42 pp.

This newly published bulletin replaces Service Bulletin H-6 and presents a wealth of data on Hycar rubbers. The characteristics of the uncompounded polymer are described as are the characteristics of typical vulcanizates. General compounding information is offered as are data on processing. Of special interest is the section on specific compounding, where such compounds as extrusion, calendering, sponge, roll, electrical insulation, highly loaded and solvent solutions are discussed. Another section of the bulltin is concerned with the adhesion of polyacrylic rubber to other materials.

•

Gear Pumps. (Bulletin No. 17A). Schutte and Koerting Co., Cornwall Heights, Bucks County, Penna. 8½ x 11 in.

This two-color bulletin describes the standard pumps produced by the company and discusses some of the special types engineered to meet unusual requirements. It describes the design, construction, and operation of these units, and tells how they are used in many industrial fields.

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ALL STEEL, ALL WELDED CONSTRUCTION, with forged steel hubs for 1¼", 1½" and 2" square bars.

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Also Special Trucks (Leaf Type) Racks, Tables and Jigs. Used in manufacturing rubber and plastic products.

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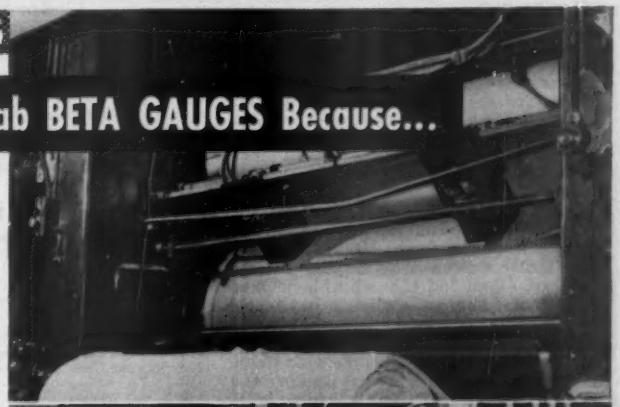

. . . if they hadn't, they wouldn't have purchased a total of five gauges over the past several years. The upper picture shows one of their newest installations. Two Tracerlab Backscatter units are controlling the thickness of rubber as it comes through the calender prior to being applied to the fabric backing. The number of off-weight rolls has decreased by 75% since their gauges were installed, Hood reports. Since off-weight rolls averaged about 70% heavy and 30% light, there has been appreciable material saving and improved quality.

By having a gauge near each end of the calender, non-uniform material produced by "cocked" rolls has been eliminated. The lower picture shows the circular recorders mounted above the Tracerlab gauge consoles. Located 50' from the gauge heads they are adjacent to the operators. Product changes can be noted instantly and the necessary calender adjustments made.

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MARKETS NEWS-PRICES

NEW YORK, JULY 13, 1953

Raw Rubber

Natural: Since our last report (June 15), the average price of spot rubber on the New York Commodity Exchange has moved in a range of .88c, high for the period being 24.38c reached on June 18 and again on June 24, and low being 23.50c reached on July 1, 2 and 6. The average price of spot rubber for the month of June was 24.42c based on 22 trading days. This compares with an average of 25.52c in the previous month.

World production of natural rubber in the first half-year is estimated in London to have been about 825,000 tons. Consumption has risen to 790,000 tons, against 735,000 tons in the first half of 1952. The production picture is more obscure than usual because of the ban imposed by the Indonesian government early this year on the export of rubber on consignment, principally to Malaya. Statistically, it has always been necessary to take Indonesian smallholders' exports as equivalent to production, but this year even this approximation cannot be regarded as a reasonable guide. If allowance is made, therefore, for rubber which is believed to be stocked in Indonesia, world output in the first half-year may have been as great as in the first half of 1952, when it was 857,000 tons.

Indonesia unquestionably produced more rubber than Malaya, and a significant factor is that it is selling more to the U. S. On the basis of available figures, Indonesian production is estimated at 330,000 tons. Allowing for stocks, however, brings the total to what it was in the first half of 1952, namely, 363,000 tons.

Synthetic: Some trade sources are of the opinion that the eventual sale of the synthetic rubber plants may be delayed by as much as two or three years. They point to a recent statement by Senator Homer Capehart (Rep., Ind.), in which he pointed out that if Congress is given a final voice in the sale of the government-owned plants, the sales program might be delayed by as much as three years. Senator Capehart, chairman of the Senate Banking and Currency Committee which is holding hearings on disposal, added that he believes most potential bidders are inclined to favor the Congressional control, but that he wondered whether they had thought of the unlimited debate Senate rules allow.

The testimony presented before both the House Armed Services Committee and the Senate Banking and Currency Committee on the question of disposal seems to indicate that there is little controversy about the disposal method. The only doubts raised, largely from the Democrats so far, have been on the question of whether now is the time to dispose of the plants, whether they will be all bought by "big business," and whether the government will actually recover its investment. Senator Paul Douglas (Dem., Ill.), for example, has already asked that Congress consider the anti-trust records of the large rubber manufacturing companies before authorizing sale of the plants.

Price Data

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM JUNE 16 TO JULY 12

June	Spot	July	Sept.	Dec.	Mar.	Sales
16	24.60	24.16	24.19	23.80	23.60	29
17	24.25	23.95	23.95	23.65	23.50	21
18	24.38	24.10	24.10	23.80	23.70	3
19	24.25	24.00	24.00	23.70	23.60	8
20						
21						
22	24.25	23.90	24.01	23.80	23.65	22
23	24.25	24.00	24.01	23.80	23.65	60
24	24.38	24.20	24.20	23.85	23.70	99
25	24.25	23.91	23.95	23.85	23.70	30
26	24.00	23.50	23.80	23.50	23.45	40
27						
28						
29	23.62	23.25	23.60	23.50	23.30	17
30	23.62	23.20	23.30	23.25	23.05	4
July						
1	23.50	23.10	23.20	23.10	23.00	24
2	23.50	23.35	23.35	23.30	23.15	31
3	23.62	23.50	23.65	23.65	23.50	57
4						
5						
6	23.50	23.10	23.45	23.45	23.30	40
7	23.75	23.20	23.60	23.60	23.40	3
8	24.12	23.35	23.94	23.90	23.70	25
9	24.00	23.25	23.80	23.80	23.60	18
10	23.88	23.00	23.60	23.40	23.30	7
11						
12						

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.23⅞
August	.23¾
September	.23½
Thin Latex Crepe:	
Spot	.25¼
Thin Brown Crepe, No. 2	.21
Smoked Blankets	.20½
Flat Bark Crepe	.18⅝

London Market

(Standard Smoked Sheets)

August	22.90 - 23.19
Oct.-Dec.	23.19 - 23.33

Singapore Market

(Standard Smoked Sheets)

August	21.98 - 22.06

Synthetic Rubber

(Dry Types—Per Pound)

Butaprene NF	.490 - .500
Butaprene NL	.500 - .510
Butaprene NAA	.540 - .550
Butaprene NXM	.580 - .590
Chemigum 30N4NS	.500 - .510
Chemigum 50N4NS	.500 - .510
Chemigum N3	.580 - .590
G-E Silicone Rubber (compounded)	3.13 -4.00
G-S Silicone Gum (not compounded)	—— -4.48
GR-I	—— - .2075
GR-S	—— - .230
Hycar OR-15	.580 - .590
Hycar OR-25	.500 - .510
Hycar OS-10	.550 - .560
Neoprene Types AC and CG	—— - .550
Neoprene Type GN	—— - .410
Neoprene Type GN-A	—— - .410
Neoprene Type GRT	—— - .420
Neoprene Type KNR	—— - .750
Neoprene Type Q	—— -1.00
Neoprene Type S	—— - .420
Neoprene Type W	—— - .410
Neoprene Type WRT	—— - .450
Paracril B	.500 - .510
Paracril BJ	.500 - .510
Paracril C	.580 - .590
Silastic (compounded)	2.35 -4.40
Thiokol Type A	—— - .470
Thiokol Type FA	—— - .640
Thiokol PR-1	—— - .950
Thiokol Type ST	—— -1.000

Middling Upland Quotations

	June 15	July 10		
	Close	High	Low	Close
July	33.50	33.52	33.38	33.38
Oct.	33.70	34.14	33.94	33.96
Dec.	33.80	34.28	34.12	34.12

Liquid Latex

Natural: According to Latex and Rubber, Inc., the demand for Hevea latex continues to be very good despite seasonal slowdowns in certain fields. Supplies continue to be excellent. Some overpurchases have been evident, and liquidation of such supplies have provided advantageously priced lots for those able to purchase at that time.

The wide spread between differentials for "spot" or "nearby" latex and "long term" contracts has narrowed, but there is still a significant differential advantage present in the discount for forward purchases. With supply at its near maximum and present estimates of consumption still at high levels, there appears to be no immediate prospect of a serious glut or still further appreciable declines in the differentials.

Synthetic: It is estimated that 4,261 long tons (dry weight) of GR-S latices were produced in April of this year, and 216 tons imported. Consumption for the month is estimated at 4,387 long tons with stocks on hand as of April 30 at 4,884 long tons.

Production of GR-S latices in the first four months of 1953 has been estimated at 16,194 long tons by the Department of Commerce. In the first four months of 1952, production was 11,818 long tons.

Neoprene latices produced in the first four months of 1953 totaled 3,321 long tons, while 1,724 long tons of acrylonitrile latices were produced in the same period. 2,930 long tons of neoprene latex were consumed in the first four months of 1953 and 1,366 of acrylonitrile latices.

Cotton

The price of middling uplands on the New York Cotton Exchange has moved in the rather narrow range of .65c since our last report (June 15), high for the period being 34.55c reached on July 7, and low being 33.90c reached on June 24 and again on July 1. The average price of middling uplands for the month of June was 34.11c based on 22 trading days. This compares with an average of 34.30c in May.

The Department of Agriculture has reported that plantings of cotton this year were 9% under those of last year. This indicated that drought and other unfavorable conditions in growing areas might keep the crop from becoming a surplus problem. While the reduction is not as much as the 18% requested by Secretary of Agriculture Benson, it may result in a crop below the top goal of 12,500,000 bales set by the Secretary.

According to recent reports, Mexico's 1953 cotton crop probably will not exceed 1,100,000 bales, and if the drought is prolonged, it may even drop below 1,000,000 bales. This is the third year of drought which has been the principal limiting factor on Mexico's cotton crop. An estimated 2,050,000 acres were planted in 1953, but about 13% of this has already been lost.

On June 22, the Department of Agriculture extended price support loans on 1952-crop cotton another 12 months to give cotton borrowers additional time to redeem and sell the commodity. Thus, loans maturing on July 31, will run to the same date next year. Latest reports show that 2,312,648 bales from the 1952 crop of about 15,000,000 bales had been placed under price support loans.

MARKETS

NEWS-PRICES

NEW YORK, JULY 13, 1953

Reclaimed Rubber

According to reports from the trade, shipments of reclaimed rubber were up during the month of June. Some reclaimers have been operating on a six-day week. July, however, gives promise of being a slow month in that a number of plants are shutting down for vacations, and a few consuming plants are following suit. There will also be shutdowns in August for the same reason, leaving July and August as rather quiet months, the trade sources state. Reclaimers are loathe to predict what changes, if any, the fall months will bring.

Consumption of reclaimed rubber in May has been estimated at 25,122 tons by the Rubber Manufacturers Association. This is 5.3% less than the 26,527 tons consumed in the previous month. Reclaimers report that scrap has been readily available for the past few months. Prices for reclaimed rubber have remained virtually unchanged during the past period. Current quotations follow:

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.10½
First Line Whole Tire	.10
Second Line Whole Tire	.09½
Third Line Whole Tire	.09¼
Fourth Line Whole Tire	.08¾
Black Carcass	.14¼
No. 1 Light Colored Carcass	.20¾
No. 1 Select Peel	.11¾
No. 1 Peel	.10½
Butyl Tube Reclaim	.12½
S.P. Natural Rubber Black Tube	.16
Natural Rubber Black Tube	.15
Natural Rubber Red Tube	.24¼
Natural Rubber Gray Tube	.24¼

Tire Fabrics

Recent reports from the trade state that rapid strides have been made in the technological development of improved types of tire cord and they may soon be available in commercial quantities. These considerably stronger tire yarns in some cases will be available, it is believed, at a cost only slightly above that of the present standard rayon cord.

High tenacity rayon has captured practically the entire popular-priced tire market, displacing cotton almost completely in recent years. Rayon is now used in producing an estimated 97% of all popular-priced tires.

Nylon is, at present, the strongest fiber used for tires but its higher cost restricts its use. The newly-developed cords, however, will provide a substantial amount of increased strength, added safety and wearability at considerably less cost than nylon.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.76½
1650	lb.	.73½
2200	lb.	.73

Nylon Tire Cord

210	lb.	2.00
840	lb.	2.00

Rayon Graded Fabric

1100	lb.	.72
1650	lb.	.69½
2200	lb.	.68½

Cotton Chafers

14.4 oz. (per square yard)	lb.	.72
9.25 oz. (per square yard)	lb.	.68½
11.65 oz. (per square yard)	lb.	.65
8.9 oz. (per square yard)	lb.	.70

Scrap Rubber

While scrap rubber exports in the first quarter of this year were greater than for the same period a year ago, their dollar value was down, according to figures recently released by the U. S. Department of Commerce.

First quarter 1953 scrap exports amounted to 8,366,864 pounds, or 2,385,861 pounds more than the 5,981,003 pounds shipped abroad in the first 3 months of 1952. Value of the exports in this year's first quarter, however, was only $222,218, compared with $268,110 in the same quarter of the preceding year.

Marketwise, there has been little change with most reclaimers out of the market for the traditional vacation periods. Current price quotations follow:

(Prices Delivered Akron)

Mixed tires	ton	14.00
Light colored carcass	lb.	.04½
No. 1 peelings	ton	45.00
No. 2 peelings	ton	30.00
No. 3 peelings	ton	24.00
Buffings	ton	16.00
Truck and Bus S.A.G.	ton	16.00
Passenger S.A.G.	ton	15.00
Natural Rubber Red Tubes	lb.	.11½
Natural Rubber Black Tubes	lb.	.04¼
Butyl Rubber Tubes	lb.	.02½

Rubber

Natural – Synthetic

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Cumberland 3-1400

STATISTICS *Of Interest to the Rubber Industry*

U. S. Imports and Re-Exports of Natural Rubber

	GROSS IMPORTS												
	Natural Rubber (Dry)			Natural Rubber (Latex)			Guayule				RE-EXPORTS		
Year	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Total Gross Imports Long Tons	Long Tons	Total Declared Value	TOTAL NET IMPORTS Long Tons
1936	467,064	152,072,496	14.54	19,852	6,659,899	14.98	1,229	286,552	10.41	488,145	12,581	4,488,223	475,564
1937	574,600	237,307,041	18.44	23,185	10,213,670	19.67	2,691	745,873	12.37	600,476	7,948	3,386,408	592,528
1938	397,640	125,373,864	14.08	11,944	4,168,127	15.58	2,508	628,886	11.19	412,092	5,652	1,799,124	406,440
1939	469,946	167,586,780	15.92	27,437*	10,467,552	17.03	2,233	463,345	9.27	499,616	13,125	5,832,618	486,491
1940	781,202	303,308,823	17.33	33,789	14,593,466	19.28	3,633*	758,007	9.31	818,624	7,060	3,197,136	811,564
1941	989,498	401,976,317	18.14	34,797*	15,965,627	20.48	4,881	1,145,767	10.48	1,029,176	5,376	2,757,872	1,023,800
1942	266,276	112,537,426	18.87	10,646	5,630,667	23.61	5,523	1,660,792	13.42	282,445	10,856	5,913,386	271,589
1943	50,358	31,369,198	27.81	1,890	1,312,202	31.00	7,678*	3,636,789	21.14	59,926	22,583	16,446,707	37,343
1944	103,847	73,908,549	31.77	3,091	2,092,211	30.22	6,701*	3,351,233	22.33	113,639	9,739	8,712,695	103,900
1945	134,408	95,814,102	31.82	4,773	3,115,853	29.14	10,040	5,963,797	26.52	149,221	9,509	7,201,746	139,712
1946	376,502	228,796,110	27.13	8,421	5,843,085	30.98	5,344	2,859,246	23.89	390,267	7,711	5,331,954	382,556
1947	691,087	306,951,814	19.83	17,542	9,787,722	24.91	2,884	1,492,825	23.11	711,513	4,121	2,354,494	707,392
1948	702,293	290,849,177	18.49	32,745	18,288,223	24.93	302	71,330	10.53	735,340	6,672	3,259,324	728,668
1949	630,808	225,343,624	15.95	29,743	14,968,650	22.47	....	.....	....	660,551	6,253	2,746,109	654,298
1950	747,109	416,222,598	24.87	54,401	41,764,486	34.27	739	254,331	15.37	802,249	8,640	6,832,821	793,609
1951	677,874	727,343,348	47.90	54,963	80,178,309	65.12	1,619	1,258,941	34.71	734,456	2,603	3,947,740	731,853
1952	756,987	578,179,519	34.09	48,228	40,563,116	37.55	782	358,095	20.44	805,997	3,024	2,592,099	802,973
1952:													
Mar.	81,577	76,567,896	41.90	3,570	4,149,537	51.88	25	12,701	22.68	85,172	93	127,007	85,079
Apr.	78,098	71,497,007	40.87	4,821	4,402,416	40.77	55	27,927	22.67	82,974	85	103,819	82,889
May	55,764	45,898,163	36.74	3,409	3,140,619	41.12	15	7,644	22.62	59,188	130	150,568	59,058
June	62,744	48,168,471	34.27	4,445	3,934,931	30.62	74	28,985	16.85	67,263	1,555	190,975	65,708
July	45,718	30,026,066	29.32	2,295	2,378,572	33.74	412	153,855	16.66	48,425	135	128,437	48,290
Aug.	62,455	37,485,360	26.79	4,684	3,513,319	33.49	....	.....	....	67,139	373	278,927	66,766
Sept.	47,696	28,223,624	26.42	3,813	2,771,909	32.45	....	.....	....	51,509	279	202,978	51,230
Oct.	50,762	29,340,768	25.84	4,890	3,272,571	29.88	....	.....	....	55,652	337	248,642	55,315
Nov.	44,458	24,209,723	24.32	4,321	2,866,961	29.62	....	.....	....	48,779	585	414,704	48,194
Dec.	72,160	38,104,339	23.57	6,032	3,817,116	28.25	....	.....	....	78,192	615	417,656	77,577
1953:													
Jan.	57,516	31,296,490	24.29	6,250	4,168,234	29.77	....	.....	....	63,766	528	375,052	63,238
Feb.	42,562	24,336,087	25.80	6,338	4,480,115	31.55	....	.....	....	48,900	981	663,761	47,919
Mar.	50,115	28,724,364	25.59	6,671	4,733,320	31.68	....	.....	....	56,786	605	435,030	56,181

Source: Bureau of the Census, U. S. Department of Commerce. * Adjusted to agree with total gross imports.

Notes: (1) Figures for latex are on a dry weight basis. (2) Figures for re-exports include natural rubber (dry and latex) and guayule. (3) In the years 1940 through 1943, crepe sole rubber imports were reported under separate classification. Such imports, which are included under natural rubber, dry above, were: 856,294 pounds, valued at $191,097 in 1940; 379,607 pounds, valued at $85,924 in 1941; 662,503 pounds, valued at $159,530 in 1942; and 21,653 pounds, valued at $5,215 in 1943.

Natural Rubber
(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1949	660,792	574,522	6,253	106,619
1950	802,249	720,268	8,644	89,215
1951	733,048	454,015	2,603	76,569
1952	805,997	453,846	3,024	95,260
1952:				
Feb.	76,383	34,841	95	73,959
Mar.	85,172	35,682	93	61,553
Apr.	82,974	36,417	85	59,422
May	59,188	36,437	130	63,988
June	67,246	36,946	156	72,995
July	49,251	32,760	136	84,839
Aug.	67,139	32,941	373	86,657
Sept.	52,785	45,110	279	84,150
Oct.	55,651	45,110	337	82,861
Nov.	48,777	41,749	585	86,243
Dec.	78,148	44,790	615	95,260
1953:				
Jan.	57,517	47,766	528	97,730
Feb.	48,455	45,231	981	94,151
Mar.	56,786	50,707	605	98,627
Apr.	60,574	49,375	692	108,892

Source: Rubber Division, NPA, U. S. Department of Commerce.

U.S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

	Balata		Jelutong		Gutta-Percha & Other Guttas	
Year	Tons	Value	Tons	Value	Tons	Value
1936	535	199,368	6,163	1,296,364	1,568	555,643
1937	354	151,344	7,109	2,017,786	1,122	440,894
1938	509	181,140	9,132	2,944,504	444	204,582
1939	694	265,553	6,640	1,603,418	1,740	539,255
1940	648	300,500	7,451	2,449,137	2,340	1,004,885
1941	924	489,514	8,821	2,954,001	1,783	607,025
1942	1,544	1,107,059	1,200	530,296	804	525,763
1943	1,047	708,701	35	14,840	....	.....
1944	1,012	660,805	88	45,578	10	4,999
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1948	1,195	805,078	3,401	2,377,765	423	542,788
1949	1,391	814,554	1,043	834,978	197	189,021
1950	2,117	1,589,885	1,789	1,515,162	541	745,418
1951	2,452	1,973,271	1,669	2,608,359	383	430,539
1952	988	762,994	1,636	2,094,983	282	385,890
1952:						
Jan.	126	95,203	204	375,802	27	59,439
Feb.	31	23,118	15	211,229	10	33,474
Mar.	50	43,207	128	217,096	27	43,861
Apr.	49	31,239	234	409,076	32	41,391
May	57	32,488	92	141,257	26	27,853
June	57	31,787	212	273,357	30	50,941
July	55	35,941	100	148,350	16	18,422
Aug.	16	9,037	142	193,364	28	31,011
Sept.	109	51,414	148	183,692	15	12,291
Oct.	130	125,137	95	99,181	20	17,937
Nov.	176	139,154	78	67,764	18	23,392
Dec.	132	145,270	101	87,548	14	25,878
1953:						
Jan.	...	.....	77	155,276	6	10,474
Feb.	105	67,265	120	182,792	21	32,473
Mar.	84	74,828	97	83,918	22	44,791

Source: U. S. Department of Commerce.

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Synthetic Rubber—Totals

(GR-S, Neoprene, Butyl, and Buna N Types)

(All Quantities in Long Tons)

Year	Production	Imports	Consumption	Exports	Stocks On Hand at End of Period
1942	22,434	.....	17,651	1,419	4,612
1943	231,722	.....	170,891	18,148	41,568
1944	762,630	11,043	566,670	104,266	142,927
1945	820,373	10,407	693,580	83,778	203,454
1946	740,026	7,709	761,699	72,920	114,963
1947	508,702	1,093	559,566	11,385	62,366
1948	488,343	15,671	442,072	4,874	115,111
1949	393,690	17,242	414,381	6,483	98,042
1950	476,184	25,722	538,289	7,652	52,758
1951	845,159	10,085	758,897	9,249	129,912
1952	798,556	19,891	807,037	22,101	118,987
1953:					
Jan.	69,482	1,516	72,810	1,487	117,875
Feb.	66,970	1,240	68,888	1,262	114,099
Mar.	81,408	1,542	77,903	1,691	116,089
Apr.	82,952	1,296	77,221	1,489	122,041
May	85,302	1,483	72,309	1,591	132,066

Source: U. S. Department of Commerce.
Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures shown include the output of both government and privately-owned plants. (3) Figures for 1941 are estimated.

Synthetic Rubber—By Type

(All Quantities in Long Tons)

New Supply

	GR-S (Buna S)	GR-M (Neoprene)	GR-I (Butyl)	Buna N Types	Total
1945	724,859	45,672	52,378	7,871	830,780
1946	613,408	47,766	80,823	5,738	747,735
1947	408,858	31,495	62,824	6,618	509,795
1948	405,492	34,848	56,662	7,012	504,014
1949	310,599	35,215	54,046	11,072	410,932
1950	378,887	50,067	60,915	12,037	501,906
1951	704,529	58,907	76,475	15,333	855,244
1952	654,854	65,745	81,630	16,228	818,447

Consumption

1945	600,145	42,394	43,012	8,029	693,580
1946	632,126	44,357	79,228	5,988	761,699
1947	448,589	37,703	68,838	4,536	559,666
1948	345,313	32,118	58,870	5,771	442,072
1949	299,420	31,753	50,855	8,827	414,381
1950	416,230	43,781	66,348	11,930	538,289
1951	626,444	48,887	70,500	13,066	758,897
1952	666,420	55,522	71,229	13,866	807,037

Exports

1945	76,555	5,837	980	406	83,778
1946	68,763	2,642	495	797	72,697
1947	7,951	2,617	62	755	11,385
1948	1,093	2,875	21	885	4,874
1949	1,401	3,330	178	1,574	6,483
1950	900	4,826	31	1,895	7,652
1951	483	6,825	216	1,725	9,249
1952	9,467	9,813	126	2,695	22,101

Stocks at End of Period

1945	170,571	9,703	18,378	4,802	203,454
1946	81,483	10,470	19,478	3,755	115,186
1947	40,606	5,237	13,184	3,339	62,366
1948	96,282	5,072	10,995	2,762	115,111
1949	77,731	4,654	12,224	3,433	98,042
1950	36,942	5,733	7,243	2,840	52,758
1951	105,271	8,379	12,481	3,821	129,912
1952	83,861	8,535	22,716	3,875	118,987

Source: U. S. Department of Commerce.
Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures for GR-M and Buna N Types include production of privately-owned plants.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	51,746	57,057	61,308	63,125	66,981	80,670	86,863	89,634
Feb.	47,654	50,551	56,487	57,980	53,274	72,864	82,043	86,458
Mar.	56,703	59,947	68,171	73,282	78,780	86,962	87,065	98,158
Apr.	62,111	64,140	72,183	75,318	80,350	87,573	98,653	.....
May	66,800	70,865	77,186	81,665	89,035	100,266	101,137	.....
June	63,247	71,329	78,044	83,374	90,174	96,364	99,305	.....
July	60,076	73,441	81,428	83,129	91,677	100,567	105,307	.....
Aug.	66,729	72,089	80,351	84,707	94,507	101,453	102,954	.....
Sept.	62,268	71,384	76,159	80,832	86,725	91,891	100,095	.....
Oct.	66,637	73,277	75,164	79,327	89,067	100,209	103,689	.....
Nov.	61,345	64,158	72,560	76,346	82,688	88,581	91,326	.....
Dec.	61,101	67,506	72,162	75,628	81,032	84,351	95,817	.....
Total	735,417	795,015	871,270	913,713	994,290	1,091,951	1,154,254	

Source: U. S. Bureau of Mines.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude [a]	Exports	Stocks On Hand at End of Period
1937	185,033	162,000	29.8	13,233	28,800
1938	122,400	120,800	27.6	7,403	23,000
1939	186,000	170,000	28.7	12,611	25,250
1940	208,971	190,244	29.3	11,347	32,636
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007 [b]	254,820	64.6	30,405	42,532
1943	304,058 [c]	291,082	59.6	15,678	46,201
1944	260,631 [d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1948	266,861	261,113	24.4	11,428	32,630
1949	224,029	226,679	22.5	10,637	28,263
1950	314,008	303,733	24.1	11,740	35,708
1951	366,700	346,121	28.6	14,722	45,082
1952	274,981	280,002	22.2	11,180	30,664
1952:					
Dec.	25,642	24,300	20.9	1,012	30,664
1953:					
Jan.	27,258	24,696	20.5	866	31,244
Feb.	24,583	24,098	21.1	950	30,631
Mar.	27,964	27,334	21.2	1,115	30,280
Apr.	29,032	26,483	20.9	1,261	31,263
May	26,912	25,213	21.2	1,188	31,751

Source: U. S. Department of Commerce.
Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. [a] Includes natural and synthetic rubber. [b] Includes 893 tons of imports. [c] Includes 67 tons of imports. [d] Includes 21 tons of imports.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1933	1,573,512	346,545	1,920,057	1943	0	4,501	4,501
1934	2,177,919	575,192	2,753,111	1944	0	124,819	124,819
1935	3,252,244	694,690	3,946,934	1945	83,792	313,643	397,435
1936	3,669,528	781,862	4,451,390	1946	2,148,699	930,760	3,079,459
1937	3,915,889	892,382	4,808,271	1947	3,558,178	1,220,634	4,778,812
1938	2,000,985	485,852	2,486,837	1948	3,909,270	1,363,856	5,273,126
1939	2,866,796	704,308	3,571,104	1949	5,108,841	1,123,736	6,232,577
1940	3,692,328	721,637	4,413,965	1950	6,665,836	1,332,263	7,998,099
1941	3,744,500	875,381	4,619,681	1951	5,337,729	1,420,432	6,758,161
1942	220,814	133,083	353,897	1952	4,320,788	1,212,390	5,533,178
1952:							
Jan.	273,639	100,993	374,632	July	168,327	43,231	211,558
Feb.	334,058	100,533	434,591	Aug.	218,577	52,056	270,633
Mar.	373,237	109,167	482,404	Sept.	438,397	112,375	550,772
Apr.	416,155	112,833	528,988	Oct.	471,808	132,064	603,872
May	398,286	105,208	503,494	Nov.	405,111	114,106	519,217
June	408,700	109,526	518,226	Dec.	418,977	115,814	534,791
1953:							
Jan.	453,319	111,599	564,918	July	.....	.....	.....
Feb.	486,071	96,740	582,811	Aug.	.....	.....	.....
Mar.	566,320	134,129	700,449	Sept.	.....	.....	.....
Apr.	596,633	126,788	723,421	Oct.	.....	.....	.....
May	549,677	93,493	643,170	Nov.	.....	.....	.....
June	.....	.....	.....	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.
Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Rim Production

	1948	1949	1950	1951	1952
Passenger Car	23,842,796	27,715,344	35,096,404	29,145,367	24,936,844
Truck & Bus	6,920,231	4,238,174	6,625,129	6,877,419	5,752,674
Agricultural	3,140,882	2,695,430	2,853,483	3,019,581	2,073,116
Earth Mover	13,330	9,895	15,602	28,026	31,791
Total	33,917,239	34,658,843	44,590,618	39,070,393	32,794,425

	1952	1953				
	Dec.	Jan.	Feb.	Mar.	Apr.	May
Passenger Car	2,561,628	2,646,978	2,667,879	3,116,429	3,059,450	2,953,694
Truck & Bus	595,829	582,137	508,171	634,586	532,765	442,562
Agricultural	141,251	259,023	201,019	227,518	203,706	188,430
Earth Mover	2,687	2,095	2,767	3,424	2,058	1,954
Total	3,301,395	3,490,233	3,379,836	3,981,957	3,797,979	3,586,640

Source: The Tire & Rim Association, Inc.

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Automotive Pneumatic Casings

(Thousands of Units)

	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory End of Period
1942 (total)	6,680	8,872	207	15,759	15,351	6,247
Passenger Car.	910	2,734	38	3,682	2,790	4,432
Truck and Bus	5,770	6,138	169	12,077	12,561	1,815
1943 (total)	6,128	18,547	225	24,900	20,423	1,883
Passenger Car.	82	10,606	71	10,759	7,620	1,132
Truck and Bus	6,046	7,941	154	14,141	12,803	751
1944 (total)	6,654	26,439	263	33,356	33,446	2,013
Passenger Car.	208	18,330	130	18,668	18,819	1,218
Truck and Bus	6,446	8,109	133	14,688	14,627	795
1945 (total)	5,984	36,479	504	42,967	44,524	3,077
Passenger Car.	1,115	25,463	222	26,800	28,200	2,214
Truck and Bus	4,869	11,016	282	16,167	16,324	863
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car.	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	25,056	62,871	3,256	91,183	95,550	6,949
Passenger Car.	19,644	52,857	1,608	74,109	77,795	5,444
Truck and Bus	5,412	10,014	1,648	17,074	17,755	1,505
1948 (total)	26,845	49,148	1,787	77,781	81,314	10,698
Passenger Car.	21,589	41,295	656	63,540	66,738	8,773
Truck and Bus	5,256	7,853	1,132	14,241	14,576	1,925
1949 (total)	31,584	43,466	1,467	76,517	76,369	10,638
Passenger Car.	28,129	36,440	509	65,077	65,140	8,904
Truck and Bus	3,456	7,026	958	11,440	11,228	1,734
1950 (total)	41,349	56,808	1,430	99,587	92,754	3,794
Passenger Car.	36,678	47,103	642	84,423	78,598	3,050
Truck and Bus	4,671	9,705	788	15,164	14,156	743
1951 (total)	32,153	44,612	1,677	78,442	83,405	8,765
Passenger Car.	26,729	34,226	723	61,678	65,546	6,973
Truck and Bus	5,424	10,386	954	16,764	17,859	1,791
1952 (total)	29,484	54,342	1,520	85,346	90,411	14,110
Passenger Car.	24,106	45,458	741	70,305	74,341	11,251
Truck and Bus	5,378	8,884	779	15,041	16,070	2,859
1953:						
Jan. (total)	3,004	4,794	84	7,882	8,238	14,118
Passenger Car.	2,563	3,916	33	6,512	6,824	11,288
Truck and Bus	440	878	51	1,369	1,414	2,830
Feb. (total)	3,263	3,895	85	7,243	8,236	15,295
Passenger Car.	2,764	3,161	28	5,953	6,847	12,310
Truck and Bus	499	735	57	1,290	1,389	2,985
Mar. (total)	3,570	4,598	87	8,256	9,407	16,456
Passenger Car.	3,039	3,793	41	6,874	7,918	13,364
Truck and Bus	531	805	46	1,382	1,488	3,092
Apr. (total)	3,798	5,001	115	8,913	9,262	16,872
Passenger Car.	3,290	4,265	45	7,599	7,833	13,666
Truck and Bus	508	736	70	1,314	1,429	3,207
May (total)	3,200	5,604	139	8,942	8,987	16,973
Passenger Car.	2,822	4,816	75	7,712	7,655	13,656
Truck and Bus	378	788	64	1,230	1,331	3,318

Source: The Rubber Manufacturers Association, Inc.

Cotton, Rayon and Nylon Tire Fabrics

(Production in Thousands of Pounds)

	Cotton: Tire Cord Not Woven	Cotton: Cord Fabric Woven	Cotton: Chafer and All Other Tire Fabrics	Cotton: Total	Rayon and Nylon[b]: Tire Cord Not Woven	Rayon and Nylon[b]: Tire Cord And Other Tire Fabrics	Rayon and Nylon[b]: Total
1950:							
Jan.-Mar.	3,939	19,210	12,948	36,097	12,469	60,981	73,450
Apr.-June	11,077	29,498	14,071	54,646	11,510	59,966	71,476
July-Sept.	10,529	39,792	15,101	65,152	13,161	61,614	74,775
Oct.-Dec.	13,314	37,759	14,405	65,578	12,942	63,399	76,341
Total	38,859	126,259	56,525	221,473	50,082	245,960	296,476
1951:							
Jan.-Mar.	11,497	38,269	16,737	66,503	11,878	65,512	77,390
Apr.-June	12,608	42,491	17,055	72,154	11,979	61,957	73,936
July-Sept.	16,744	44,340	17,433	78,517	12,091	67,982	80,073
Oct.-Dec.	14,237	43,820	13,899	71,956	*a*	83,354	83,354
Total	55,116	168,920	65,124	289,160	35,948	278,805	314,753
1952:							
Jan.-Mar.	11,226	36,378	12,971	60,575	14,434	72,249	86,683
Apr.-June	4,661	24,612	10,742	40,015	16,874	81,249	98,123
July-Sept.	335	9,257	9,460	19,052	18,128	80,355	98,483
Oct.-Dec.	*c*	4,728[a]	11,580	16,308	19,436	81,171	100,607
Total	16,222	74,975	44,753	145,950	68,872	315,024	383,896
1953:							
Jan.-Mar.	*c*	4,378[a]	15,477	19,855	20,487	91,742	112,229
Apr.-June	.....	.....	.....	.....	.....	.....	.....
July-Sept.	.....	.....	.....	.....	.....	.....	.....
Oct.-Dec.	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....

Source: U. S. Bureau of the Census.
Notes: (a) Included with tire cord and fabrics to avoid disclosures of operations of individual mills. (b) Fuel cell fabrics are not included with rayon and nylon tire cord and fabrics. (c) Included with tire cord not woven. (d) Included with chafer and all other tire fabrics.

Automotive Inner Tubes

(Thousands of Units)

	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory End of Period
1944	6,460	20,569	196	27,224	27,488	2,813
1945	5,988	33,906	411	40,304	41,742	3,627
7946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25,046	46,560	2,483	74,088	79,181	8,059
1948	26,833	40,548	1,119	68,499	70,033	9,641
1949	31,521	31,450	887	63,858	65,114	10,657
1950	41,240	42,671	811	84,723	80,179	....
1951	32,151	32,284	1,071	65,507	67,249	10,094
1952	29,451	32,985	1,014	63,449	65,073	12,036
1953:						
Jan.	3,012	4,477	49	7,538	6,130	10,169
Feb.	3,261	3,052	51	6,364	6,428	10,308
Mar.	3,571	2,941	44	6,555	7,470	11,242
Apr.	3,797	2,896	67	6,760	7,544	12,155
May	3,200	3,315	71	6,586	6,940	12,592

Source: The Rubber Manufacturers Association, Inc.

Smoked Sheets—Spot Closing Prices

(New York Market—Cents per Pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1911	184	114	141.30	1932	4¾	2½	3.49
1912	140	108	121.60	1933	9⅞	2¾	5.96
1913	113	59	82.04	1934	15⅞	8¾	12.92
1914	93	56	65.33	1935	13¾	10½	12.37
1915	79	58½	65.85	1936	23	13½	16.41
1916	102	55	72.50	1937	26¾	14	19.39
1917	90	52	72.23	1938	17⅞	10¼	14.64
1918	70	40	60.15	1939	24	14⅛	17.57
1919	57	38½	48.70	1940	24	18¾	20.10
1920	56½	16	36.30	1941	24⅜	19½	22.40
1921	21¾	11½	16.36	1942	22½	22½	22.50
1922	28⅜	13¾	17.50	1943	22½	22½	22.50
1923	37⅛	24¾	29.45	1944	22½	22½	22.50
1924	40⅛	17¾	26.20	1945	22½	22½	22.50
1925	121	34¾	72.46	1946	22¼	22½	22.50
1926	88½	36¾	48.50	1947	25	14	20.00
1927	41¾	33	37.72	1948	25	18	21.99
1928	41¼	17	22.48	1949	19¾	15¾	17.57
1929	26⅜	13½	20.55	1950	86	18	41.10
1930	16⅛	7½	11.98	1951	76	52	(a)
1931	8¾	4¼	6.17	1952*	33	26½	29.15

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947. (a) Free trading suspended March 31, 1951. GSA selling price ranged between 52 and 66c during balance of year. * Free trading was resumed on July 1, 1952; figures represent only July through December, 1952.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1946	1947	1948	1949	1950	1951	1952	1953
Jan.	25.49	32.58	36.09	33.37	31.89	45.04	42.96	33.24
Feb.	26.57	33.91	33.63	33.41	32.79	(a)	41.64	33.76
Mar.	27.52	35.89	35.04	33.44	32.65	46.06	41.70	34.10
Apr.	28.40	35.89	38.10	33.84	33.23	46.06	41.79	33.85
May	28.17	36.51	38.57	33.73	33.64	46.06	39.68	34.30
June	29.89	37.83	38.12	33.56	34.61	46.06	41.31	34.11
July	34.11	38.03	34.89	32.99	38.11	41.21	40.37	....
Aug.	36.31	34.83	32.23	32.06	38.93	35.93	40.42	....
Sept.	37.59	32.21	31.92	30.94	41.62	36.20	39.75	....
Oct.	36.79	32.39	32.01	30.32	40.66	38.13	37.52	....
Nov.	31.50	34.50	32.15	30.52	43.11	42.70	35.59	....
Dec.	33.03	36.74	32.90	31.08	43.37	43.32	33.76	....
Average for Year	31.28	35.11	34.64	32.44	37.05	42.43	39.71	....

Note: The Government established a ceiling price of 45.76c for spot cotton on March 3, 1951. (a) Trading suspended during February.

Consumption of Vinyl Resins

(In Thousands of Pounds)

	Sheeting and Film [a]	Textile and Paper Coating Resins	Molding and Extrusion Materials	All Other
1950	227,149	46,044	113,889	21,868
1951	161,547	43,688	134,890	23,934
1952	154,902	42,298	140,872	31,793
1953:				
Jan.	14,830	4,284	15,424	3,076
Feb.	16,516	4,145	13,847	2,919
Mar.	17,575	4,950	14,906	3,683
Apr.	16,574	4,934	15,332	2,800

Source: U. S. Tariff Commission.
Note: (a) Includes weight of fillers, plasticizers, extenders and safety glass sheeting. Beginning January, 1951, statistics are listed on a resin content basis.

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Rubber Industry Employment, Wages and Hours

All Rubber Products

	1952*				1953			
Mo.	Production Workers (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Production Workers (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
Jan.	218	$74.19	40.9	$1.814	219.2	$78.09	41.1	$1.90
Feb.	215	73.31	40.5	1.810	219.3	78.31	41.0	1.91
Mar.	215	72.58	40.3	1.801	220.3	79.90	41.4	1.93
Apr.	213	71.40	39.6	1.803	219.8	....	....	....
May	213	73.47	40.5	1.814	....	....	....	....
June	215	75.01	40.9	1.834	....	....	....	....
July	202	72.15	39.6	1.822	....	....	....	....
Aug.	212	73.65	40.6	1.814	....	....	....	....
Sept.	217	75.17	41.1	1.829	....	....	....	....
Oct.	222	75.61	41.5	1.822	....	....	....	....
Nov.	227	77.44	41.3	1.875	....	....	....	....
Dec.	230	79.63	42.0	1.896	....	....	....	....

Tires and Tubes

Jan.	94.4	86.99	40.9	2.127	91.5	89.24	40.2	2.22
Feb.	94.2	85.75	40.6	2.112	91.3	89.65	40.2	2.23
Mar.	93.9	83.46	39.8	2.097	92.0	92.51	41.3	2.24
Apr.	94.6	81.90	39.3	2.084	....	....	....	....
May	94.6	84.96	40.4	2.103	....	....	....	....
June	95.3	87.79	41.1	2.136	....	....	....	....
July	93.4	84.22	39.8	2.116	....	....	....	....
Aug.	92.3	85.29	40.5	2.106	....	....	....	....
Sept.	93.8	86.24	40.7	2.119	....	....	....	....
Oct.	94.1	86.04	40.7	2.114	....	....	....	....
Nov.	94.6	88.02	40.3	2.184	....	....	....	....
Dec.	95.8	90.59	40.9	2.215	....	....	....	....

Rubber Footwear

Jan.	25.4	60.27	40.1	1.503	24.5	64.96	40.1	1.62
Feb.	24.7	60.46	39.8	1.519	24.2	67.98	41.2	1.65
Mar.	24.2	61.51	40.2	1.530	24.1	67.57	41.2	1.64
Apr.	22.0	59.42	39.3	1.512	....	....	....	....
May	23.5	60.69	39.9	1.521	....	....	....	....
June	23.7	61.38	40.3	1.523	....	....	....	....
July	19.0	58.83	39.3	1.497	....	....	....	....
Aug.	24.0	61.93	40.4	1.533	....	....	....	....
Sept.	24.8	63.03	40.9	1.541	....	....	....	....
Oct.	25.7	63.71	41.1	1.550	....	....	....	....
Nov.	26.0	68.71	42.0	1.636	....	....	....	....
Dec.	26.5	66.99	41.3	1.622	....	....	....	....

All Other Rubber Products

Jan.	97.9	65.63	41.2	1.593	103.2	71.74	42.2	1.70
Feb.	96.3	64.43	40.6	1.587	103.8	70.89	41.7	1.70
Mar.	97.2	64.83	40.8	1.589	104.2	71.55	41.6	1.72
Apr.	96.3	63.68	39.9	1.596	....	....	....	....
May	95.0	65.32	40.8	1.601	....	....	....	....
June	95.7	65.73	40.9	1.607	....	....	....	....
July	89.8	62.29	39.4	1.581	....	....	....	....
Aug.	95.5	65.44	40.8	1.604	....	....	....	....
Sept.	98.8	67.65	41.5	1.630	....	....	....	....
Oct.	102.6	68.95	42.3	1.630	....	....	....	....
Nov.	106.2	70.26	42.1	1.669	....	....	....	....
Dec.	107.5	73.01	43.2	1.690	....	....	....	....

Source: U. S. Department of Commerce and Labor.

Note: Data are based upon reports from cooperating establishments covering both full and part-time employees who worked during or received pay for the pay period ending nearest the 15th of the month. Data for employment and hours have been revised beginning 1947 to adjust to a first quarter 1951 benchmark and to incorporate more detailed weighting procedures. Also, the hourly earnings have been recalculated beginning in 1951, using as weights figures rounded to the nearest cent instead of the nearest mil. * Revised figures for 1952 not available; figures represent computations based on 1947 benchmark levels.

Production Index for the Rubber Industry

Production 1935-1939 = 100

(Based on man-hours)

	1951	1952	1953		1951	1952	1953
Jan.	244	248	268	July	243	225	....
Feb.	235	243	268	Aug.	243	242	....
Mar.	239	242	273	Sept.	245	252	....
Apr.	238	235	271	Oct.	239	260	....
May	247	242	....	Nov.	245	264	....
June	251	246	....	Dec.	250	272	....

Source: U. S. Department of Commerce.

Sales by the Rubber Industry

(In Millions of Dollars)

	1951*	1952*	1953		1951*	1952*	1953
Jan.	454	468	507	July	438	408	....
Feb.	434	442	499	Aug.	467	452	....
Mar.	459	406	510	Sept.	435	482	....
Apr.	439	437	....	Oct.	445	464	....
May	432	424	....	Nov.	438	403	....
June	433	430	....	Dec.	363	438	....

Source: U. S. Department of Commerce.
Note: Figures have been revised to conform to new benchmark levels.
* Figures based on 1947 benchmark levels. Current series not available.

Rubber Manufacturers' Inventories

(Based upon Book-Value)

(In Millions of Dollars)

	1951	1952	1953		1951	1952	1953
Jan.	562	840	915	July	616	884	....
Feb.	555	848	887	Aug.	640	884	....
Mar.	554	865	903	Sept.	659	877	....
Apr.	565	877	....	Oct.	705	874	....
May	583	878	....	Nov.	739	897	....
June	610	864	....	Dec.	799	936	....

Source: U. S. Department of Commerce.

Various Compounding Materials Consumed by the Rubber Industry

Material	1945	1946	1947	1948	1949	1950	1951
Antimony, Primary:							
Short tons	.....	.....	39	41	55	103 *	19 *
% of total	.....	.....	.002	.003	.005	.007	.001
Asphalt: [a]							
Short tons	19,483	28,715	32,113	19,967	18,050	26,819	21,414
% of total	.005	.007	.007	.004	.003	.003	.003
Barite (Barytes):							
Short tons	10,000	20,000	17,000	18,000	14,000	19,000	15,000
% of total	2.1	4.4	3.1	2.85	2.53	3.31	2.13
Carbon Black:							
Short tons	402,193	470,732	471,790	435,282	383,565	515,184	530,614
% of total	95.5	95.3	94.3	95.5	93.3	92.9	92.9
Clay, Kaolin:							
Short tons	109,936	162,393	166,201	176,965	197,341	263,306	231,331
% of total	11.7	12.3	11.5	11.3	13.1	15.0	12.7
Clay, Fire & Stoneware:							
Short tons	7,800	12,951	17,970	15,480	27,148	9,500	.....
% of total	0.1	0.2	0.2	0.2	0.3	0.1	.....
Lime:							
Short tons	7,170	3,193	589	1,154	715	908	.....
% of total	0.12	0.05	0.01	0.02	.0002	.0002	.....
Litharge:							
Short tons	1,864	2,131	2,205	2,835	1,398	3,047	2,641
% of total	1.3	1.6	1.3	1.8	1.2	1.7	1.7
Lithopone:							
Short tons	977	1,607	3,085	4,192	3,245	4,092	3,295
% of total	0.7	1.1	1.9	3.0	4.1	3.9	3.2
Mica, Ground:							
Short tons	3,715	4,951	3,900	4,372	3,856	5,776	6,551
% of total	7.1	8.0	6.0	7.0	7.0	8.0	9.0
Sulfur:							
Short tons	64,960	72,800	72,800	70,560	59,360	75,000	.....
% of total	2.0	2.2	1.8	1.7	1.5	1.3	.....
Talc: [b]							
Short tons	63,758*	65,980	71,840	66,226	53,400	75,900	70,970
% of total	16.0	14.4	13.9	13.0	12.0	12.0	11.2
Zinc Oxide:							
Short tons	63,447	83,776	82,248	82,895	58,496	82,944	71,507
% of total	49.6	53.1	51.2	54.9	52.5	51.6	48.5

Source: U. S. Bureau of Mines.
Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes prophyllite and ground soapstone. (c) Does not include precipitated antimony sulfide as in previous years. * Revised.

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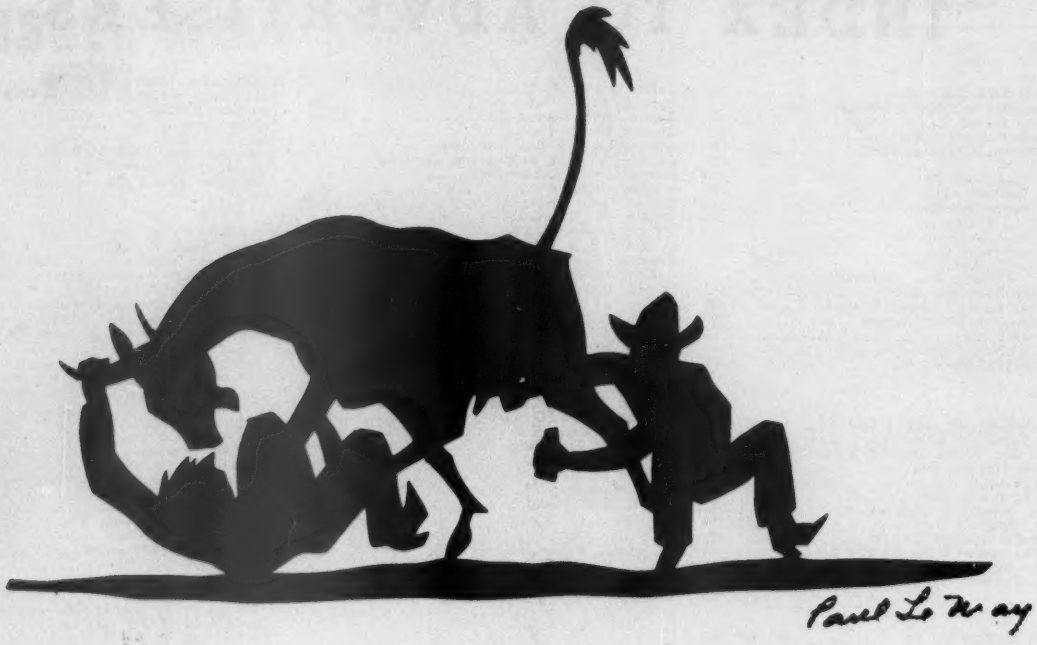

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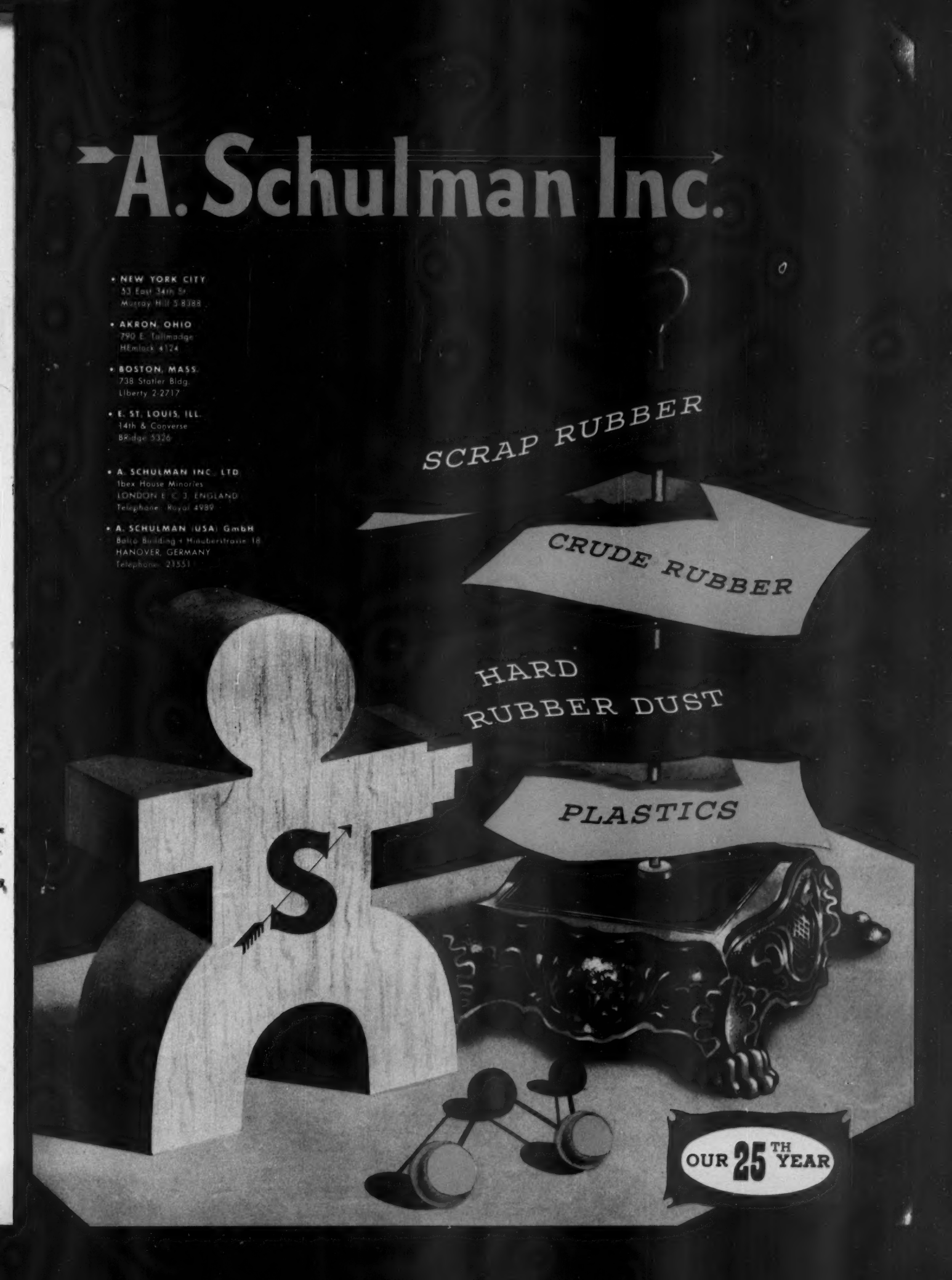

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